

**PROGRAMMATIC BIOLOGICAL ASSESSMENT
FOR ACTIVITIES THAT ARE
NOT LIKELY TO ADVERSELY AFFECT
CANADA LYNX, GRIZZLY BEAR, AND
DESIGNATED CANADA LYNX CRITICAL HABITAT**

**Beaverhead-Deerlodge, Bitterroot, Custer-Gallatin, Flathead, Helena-Lewis and
Clark, Idaho Panhandle Lolo, Kootenai, and Nez Perce-Clearwater NFs**

USDA Forest Service, Region 1

26 Fort Missoula Road

Missoula, MT 59804

December 1, 2020

Note: October 2014 and June 2020 versions of this document are obsolete.

TABLE OF CONTENTS

TABLE OF CONTENTS	II
I. INTRODUCTION	2
II. PROPOSED ACTION	2
CONDITIONS COMMON TO ALL PROJECT TYPES.....	3
PROJECTS SPECIFIC TO GRIZZLY BEARS.....	4
PROJECTS SPECIFIC TO CANADA LYNX.....	5
PROJECTS SPECIFIC TO DESIGNATED CRITICAL HABITAT FOR CANADA LYNX.....	5
III. SPECIES ASSESSMENT	5
GRIZZLY BEARS	5
<i>Distribution</i>	5
<i>Life History</i>	6
<i>Environmental Baseline</i>	8
<i>Effects Analysis</i>	11
<i>Cumulative Effects Analysis</i>	11
<i>Determination of Effects</i>	11
CANADA LYNX	12
<i>Distribution</i>	12
<i>Life History</i>	12
<i>Response to Habitat Disturbance</i>	16
<i>Environmental Baseline</i>	17
<i>Effects Analysis</i>	21
<i>Cumulative Effects Analysis</i>	22
<i>Determination of Effects</i>	22
CANADA LYNX CRITICAL HABITAT	22
<i>Distribution</i>	22
<i>History</i>	22
<i>Environmental Baseline</i>	23
<i>Effects Analysis</i>	24
<i>Cumulative Effects Analysis</i>	25
<i>Determination of Effects</i>	25
IV. LITERATURE CITED.....	26
APPENDIX A: GRIZZLY BEAR SCREENS	37
APPENDIX B: CANADA LYNX SCREENS.....	48
APPENDIX C: DEFINITIONS FROM THE NORTHERN ROCKIES LYNX MANAGEMENT DIRECTION	59
APPENDIX D: CANADA LYNX CRITICAL HABITAT SCREENS	63
APPENDIX E: CONSULTATION SUMMARY SHEET FOR PROGRAMMATIC ASSESSMENT	71

I. INTRODUCTION

Through a collaborative effort to expedite environmental review and associated consultation for Canada lynx (*Lynx canadensis*) and grizzly bear (*Ursus arctos*), which are both federally listed as threatened under the Endangered Species Act (ESA), screening criteria were developed to identify simple, straightforward projects that have insignificant or discountable effects on these species and/or designated critical habitat. Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 as amended, requires all federal agencies to review actions authorized, funded, or carried out by them to ensure such actions do not jeopardize the continued existence of listed species. To comply with this direction and increase efficiency, the interagency Region 1 Terrestrial Consultation Team developed an assessment using screening criteria to facilitate project review and consultation. The purpose of this programmatic biological assessment (BA) is to describe and analyze the adequacy of these screening criteria.

The area of analysis includes the Custer-Gallatin, Helena-Lewis and Clark, Flathead, Lolo, Beaverhead-Deerlodge, Bitterroot, Idaho Panhandle, Kootenai, and Nez Perce-Clearwater National Forests. Section 7 concurrence will be requested of Montana and Idaho Fish and Wildlife Service Offices. The concurrence for the Washington State portion of the Idaho Panhandle National Forest will be coordinated by the Idaho Fish and Wildlife Service.

II. PROPOSED ACTION

The Proposed Action implements a screening process to determine if a proposed project complies with this programmatic approach to consultation for simple, straightforward projects that would result in a “*not likely to adversely affect*” (NLAA) determination. “*No effect*” (NE) determinations are also possible in many situations; however, these are not subject to consultation and will not be discussed further. The U.S. Fish and Wildlife Service (Service) does not need to see the documentation for projects where the determination for both species and/or critical habitat is “NE”. Appendices A, B, and D contain the screens for grizzly bears, Canada lynx, and Canada lynx critical habitat.

If the proposed actions are fully compliant with the wildlife screens described in the attached appendices and the screens lead to a “*not likely to adversely affect*” conclusion, the actions will be covered for grizzly bears, Canada lynx, and Canada lynx critical habitat by a programmatic concurrence from the Service. These proposed actions could proceed once the appropriate documentation is in place. The documentation process and form are described fully in Appendix E. It is possible that even though an action is identified in the screen, standard consultation¹ procedures may still be required if there is ambiguity surrounding the proposed action. Application of the screens, documentation of the screening process, and determination of effects for compliance with Section 7 must be conducted or reviewed by journey or higher-level biologists (FSM 2634.03). If the project does not qualify for this programmatic screening concurrence process, the standard¹ Section 7 process is required if consultation is to proceed.

¹ Standard consultation refers to the process whereby the action agency biologist commences dialogue with Service counterparts to determine the appropriate consultation procedures. Typically, this involves contact to apprise the Service of the effects of an ongoing project and to reach consensus on such an effect and to determine if informal consultation is sufficient or if the project should proceed to formal consultation. Upon agreement of the respective consultation procedure, the action agency biologist will submit the appropriate request and documentation to the Service for concurrence or a biological opinion.

Types of projects covered by the screens vary depending on the species under analysis. To determine whether a proposed project is covered, the project needs to be compared against those projects identified in each species-specific or critical habitat screen (Appendices A, B, and D).

The following criteria describe overall considerations and species-specific considerations and apply to the proposed projects that meet the criteria described in the attached wildlife screens. A brief summary of project types by species follows. See the respective appendices for more detail.

Conditions Common to all Project Types

- Project types covered in this BA are for those Forest Service (FS) projects where the determination of effects clearly leads to a “*not likely to adversely affect*” (NLAA) determination. More complex projects for which species concerns are not fully covered in this programmatic BA must proceed through the standard consultation process if consultation is to proceed.
- If the screening criteria are not met for one of the species or designated critical habitat, then standard consultation procedures need to be followed for that species and/or its critical habitat. However, if screening criteria are met for the other species and/or critical habitat, the screens may be used as documentation for project activities. However, the programmatic consultation summary sheet should be included in the BA submitted through the standard consultation procedures (e.g. an appendix to the project BA) and noted in the cover letter submitted with the BA to the Service².
- Cumulative effects must be considered; cumulative effects findings may cause the project to require standard consultation processes. Under the ESA, cumulative effects are those effects of future State or private activities, not involving Federal activities, which are reasonably certain to occur within the action area of the Federal action subject to consultation.
- All actions that would not occur without implementation of the project (i.e. the ‘but for’ test) must be considered in using this screen. Per ESA regulations, effects of an action are “all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action”.
- In no case does the programmatic BA cover any project that has the potential to cause or increase the likelihood of take or adverse modification as defined by the Service’s regulations.

² The screened species and/or critical habitat should be mentioned in the body of the BA, noting that the 2020 programmatic document/concurrence were used to complete that part of the assessment. Consider using the following standardized phrase: “Since the proposed action is fully compliant with the wildlife screens established and consulted on in the *Programmatic Biological Assessment for Activities that are Not Likely to Adversely Affect Canada Lynx, Grizzly Bear and Designated Canada Lynx Critical Habitat (dated December 1, 2020)*, the effects are covered under programmatic concurrence from the U.S. Fish and Wildlife Service (USFWS reference ____).”

Table 1 identifies the major activities that are considered in the effects analyses in Appendices A, B, and D. The activity types identified below are presented to display the full range of program areas considered. **It is recognized that individual projects may involve more than one activity type and that every individual activity type within a project will need to be screened.** For example, a fuels treatment project could involve mechanical equipment use and temporary road construction in addition to prescribed fire; noxious weed control could also involve airplane or helicopter use. Not all of the activity types are eligible for this programmatic BA since some are either ambiguous or may result in an adverse effect. However, they are listed below as well as in the screens to highlight that they have been considered and to provide guidance on the appropriate consultation pathway.

Table 1. Types of activities considered for effects analysis on grizzly bears, Canada lynx and lynx critical habitat in this document.

Activities Categories		
Camping	Mechanical Use	Silviculture Activities
Forest Products	Range Management	Special Uses
Gravel Pit Use	Recreation Management	Timber Harvest
Habitat Restoration	Road Construction & Maintenance	Vegetation Management ¹
Hazard Tree/Hazardous Fuels Removal	Prescribed Fire	Watershed Restoration
Hard Rock Mining	Salvage Harvest	Weeds Management

¹Specific to Canada lynx and the Northern Rockies Lynx Management Direction (NRLMD).

Projects Specific to Grizzly Bears

The scope of this programmatic BA for grizzly bears applies to areas where grizzly bears are expected to occur; i.e., it's not limited to Recovery Zone boundaries, but rather includes the area where grizzly bears may be present.

Projects with the potential to affect grizzly bears must pass through screens to determine compatibility with the programmatic BA. A detailed discussion of projects and process elements are found in Appendix A. All projects in Table 1 must successfully comply with the following, as shown in the flowchart below on page 39:

- The project cannot contribute to motorized access conditions that are resulting in potentially significant (ESA use of the term) effects to grizzly bears.
- The project cannot include actions that result in a net increase in the amount of motorized routes or route density and/or a net decrease in the amount of core or secure habitat.
- Human foods, livestock feed, garbage, and other attractants must be managed by the application of an adequate 'food storage rule' (i.e. Northern Continental Divide (NCDE), Greater Yellowstone (GYE), Selkirk (SE) and Cabinet Yaak (CYE) food storage orders). If no specific rule exists for the area, a review and adaptation of the available food storage orders will be considered adequate.
- Projects that involve seeding or planting of grasses, forbs, or shrubs must do so in a manner that will tend not to attract bears into areas where increased mortality risk or interaction between bears and people is likely, such as adjacent to roads or in or near developed or designated recreation and/or camping sites.

Projects Specific to Canada Lynx

The scope of this programmatic BA for lynx applies to areas where Canada lynx may be present. Projects with the potential to affect Canada lynx must pass through two screens to determine compatibility with the programmatic BA. A detailed discussion of projects and process elements related to Canada lynx are found in Appendix B. All projects in Table 1 must successfully comply with the following, as shown in the flowchart below on page 49.

- The project must be in compliance with the applicable direction in the NRLMD or as it is modified and incorporated into a revised Forest Land Management Plan (e.g. Flathead National Forest's Forest Plan Appendix A).
- No snowshoe hare habitat will be affected within mapped lynx habitat in Lynx Analysis Units (LAUs).

Projects Specific to Designated Critical Habitat for Canada Lynx

The scope of this programmatic BA for lynx critical habitat applies to those areas designated as critical habitat for Canada lynx.

Projects with the potential to affect Canada lynx critical habitat must pass through a separate screen to determine compatibility with the programmatic BA. A detailed discussion of projects and process elements related to critical habitat are found in Appendix D. All projects in Table D1 must successfully comply with the following, as shown in the flowchart on page 63:

- Snowshoe hare habitat providing PCE 1a within designated lynx critical habitat will not be affected.

III. SPECIES ASSESSMENT

Grizzly Bears

Distribution

The historic range of the grizzly bear (*Ursus arctos horribilis*) in the continental United States extended from the central Great Plains, west to California, and south to Texas and Mexico. Between 1800 and 1975, grizzly bear populations in the lower 48 states declined from over 50,000 to less than 1,000. As European settlement expanded westward, the grizzly was extirpated from most of its historical range.

Five areas in the lower 48 states currently support grizzly bear populations, located in Montana, Wyoming, Idaho, and Washington and include: the Greater Yellowstone Ecosystem (GYE), Northern Continental Divide Ecosystem (NCDE), Cabinet-Yaak Ecosystem (CYE), Selkirk Ecosystem (SE), and Northern Cascades Ecosystem (NCE). These areas represent less than two percent of the grizzly's former range (USDI 1993). The grizzly bear was first listed as threatened under the Endangered Species Act (ESA) in 1975 (USDI 1993).

The Service designated grizzly bears in the GYE as a Distinct Population Segment (DPS) and removed this segment from the Endangered Species List in April 2007. On September 21, 2009, an order was issued

by the U.S. District Court for the District of Montana, Missoula Division (*Greater Yellowstone Coalition v. Servheen*, 07-cv-00134-DWM) which enjoined and vacated the delisting of the GYE grizzly population. A subsequent effort to delist the GYE occurred in 2017 but was remanded back to the Service in 2018. Hence, the GYE population remains listed under the ESA (USDI Fish and Wildlife Service 2019).

Life History

Grizzly bears are long-lived with a lifespan of over 20 years. Adult bears are individualistic in behavior and normally are solitary wanderers. Home ranges of adult bears may overlap, with male ranges generally two to four times larger than those of adult females. Female home ranges are smaller while they have cubs but increase when the cubs become yearlings. Home ranges vary in relation to food availability, weather conditions, and interactions with other bears. In general, home ranges are larger in the more arid GYE compared to more productive habitats in the northern ecosystems (USDI 1993).

Age at first reproduction and litter size varies and may be related to nutritional state. Age at first reproduction averages 5.5 years (3.5 to 8.5 years old). Reproductive intervals for females average three years and litter size averages two cubs. The limited reproductive capacity of grizzly bears precludes rapid increases in population. Grizzly bears have one of the lowest reproductive rates among terrestrial mammals. During a female's lifetime, if she has litters of two cubs with a 50:50 sex ratio, and a 50 percent survivorship of young to age 5.5 years, at best she can replace herself with one breeding age female in the first decade of her life. Females with cubs and bears defending food supplies are common causes of confrontation with humans (USDI 1993).

Grizzly bears are opportunistic feeders and will prey or scavenge on almost any available food. Plants with high crude protein content and animal matter are important food items. The search for food has a prime influence on grizzly bear movements. Upon emergence from the den, grizzly bears move to lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges where their food requirements can be met. Throughout spring and early summer grizzly bears follow plant phenology back to higher elevations. In late summer and fall, there is a transition to fruit and nut sources, as well as herbaceous and animal matter. This is a general pattern; however, bears will go where they can meet their food requirements (USDI 1993). Grizzly bears display great diet plasticity and switch food habits according to which foods are available (Servheen 1981; Kendall 1986; Mace and Jonkel 1986; Martinka and Kendall 1986; LeFranc et al. 1987; Aune and Kasworm 1989; Felicetti et al. 2003; Schwartz et al. 2003; USDI Fish and Wildlife Service 2007 and 2011; Interagency Grizzly Bear Study Team 2013; Gunther et al. 2014).

For three to six months during winter, grizzly bears enter dens in an adaptive behavior which increases survival during periods of low food availability, deep snow, and low air temperature (Craighead and Craighead 1972). The active 'bear year' for each grizzly bear ecosystem³ is defined by the emergence and subsequent entry into their winter dens. Grizzly bears excavate dens as early as September or prior to entry in November. Dens are usually dug on steep slopes where wind and topography cause an accumulation of deep snow and where snow is unlikely to melt during warm periods. Dens are generally found at high elevations well away from human development (USDI 1993).

Once they've emerged, grizzly bears use a variety of habitats. In general, a grizzly bear's daily movements are largely driven by the search for food, mates, cover, security, and/or den sites. Grizzly bears select for areas with dense vegetation that provide cover during the day when bedded and select

³ **CYE** = April 1 – November 30; **GYE** = March 1 – November 30; **NCDE** = April 1 – November 30 (westside)/April 15 – November 30 (eastside); **SE** = April 1 – November 15.

for more open areas at night when foraging (Apps et al. 2004). At broad spatial scales, grizzly bears select areas of higher forest productivity that provide thermal and security cover, but within forests, daily movements are influenced by open forest canopy areas that provide herbaceous forage value and opportunity for predation on vulnerable ungulates like elk calves in the spring (Gunther and Renkin 1990, Mace et al. 1999, Apps et al. 2004).

USDI Fish and Wildlife Service (2011) noted that key spring bear habitat was associated with lower elevation mesic habitat; while summer and fall were associated with mid- to high-elevation mesic habitat. For this BA, unless a habitat model is available, we consider **High-quality Spring grizzly bear habitat** as being characterized by snow-free forested and open habitats that afford fresh green-up of grasses, roots, and bulbs as well as foraging opportunities for small rodents. This may include riparian areas, meadows and open grassy parklands, and avalanche chutes. Aspect (east, west and south-facing) and lower elevations help differentiate spring habitat from summer and fall seasonal habitats and should be taken into consideration when evaluating how quality spring habitat evolves over the length of the season (i.e. from den emergence to later in the season). Big-game winter ranges and spring calving/fawning areas are often located at lower elevations and warmer aspects, too, and provide additional opportunities for scavenging winter-kill carcasses and elk calf/deer fawn depredation during the spring season. Grizzly bears in the GYE consume a much larger percentage of meat (e.g. elk, bison, deer) in their diet than bears in the other ecosystems; therefore, spring habitat selection is often driven more by the availability of big game herds and/or winter-kill carrion in that system (Aune and Kasworm 1989; French et al. 1989; Volson 1994; Mace et al. 1997; Waller and Mace 1997; White et al. 1998; Mace and Roberts 2011; Kasworm et al. 2018a). Typical dates for the spring season are as follows: **CYE** = April 1 – June 15 (Johnson 2008; USDA Forest Service and USDI Fish and Wildlife Service 2008); **GYE** = March 1 – July 15 (Haroldson et al. 2002; Gunther et al. 2004); **NCDE** = April 1 – June 30 (westside)/April 15 – June 30 (eastside); and **SE** = April 1 – June 15 (Johnson 2008; USDA Forest Service and USDI Fish and Wildlife Service 2008). Due to the lack of grizzly bear use in the Bitterroot, typical dates for grizzly bear seasons have not yet been established but would likely fall within the time periods listed above.

Likewise, unless a habitat quality model is available, we consider **High-quality Fall grizzly bear habitat** as being characterized by mid- and high elevation use of huckleberry (and other berry) shrub fields (often associated with old wildfire burns), riparian areas, slabrock/avalanched chutes, open meadows and grassy parklands, and whitebark pine stands. Grizzly bears in the GYE consume a much larger percentage of meat (e.g. elk, bison, deer) in their diet than bears in the other ecosystems; therefore, fall habitat selection is driven more by the availability of big game herds and/or carrion in that system (Aune and Kasworm 1989; French et al. 1989; Volson 1994; Mace et al. 1997; Waller and Mace 1997; White et al. 1998; Mace and Roberts 2011; Kasworm et al. 2018a). Typical dates for the fall season are as follows: **CYE** = September 16 – November 30 (Johnson 2008; USDA Forest Service and USDI Fish and Wildlife Service 2008); **GYE** = September 1 – November 30 (Haroldson et al. 2002; Gunter et al. 2004); **NCDE** = October 1 – November 30; and **SE** = September 16 – November 15 (Johnson 2008; USDA Forest Service and USDI Fish and Wildlife Service 2008). Due to the lack of grizzly bear use in the Bitterroot, typical dates for grizzly bear seasons have not yet been established but would likely fall within the time periods listed above.

Grizzly bear survival is influenced by age, sex, reproductive status, and home range location (i.e., proximity to humans and human activities) (Schwartz et al. 2010; Schwartz et al. 2012; Mace et al. 2012; Kasworm et al. 2018a and 2018b). While grizzly bears die from natural causes on occasion, human-caused mortality is the driving force behind grizzly bear survival rates (USDI Fish and Wildlife Service 2011; Mace and Roberts 2011; Kasworm et al. 2018a and 2018b; Costello and Roberts 2019; IGBST 2020). Throughout all recovery ecosystems, the majority of management removals result from conflicts

at sites associated with frequent or permanent human presence. Unsecured attractants such as garbage, human foods, pet/livestock foods, bird food, livestock carcasses, wildlife carcasses, barbeque grills, compost piles, orchard fruits, or vegetable gardens are usually the source of these conflicts and subsequent removals (USDI Fish and Wildlife Service 2011; Manley and Vallieres 2019; Kasworm et al. 2018a and 2018b). As noted earlier, distance to human settlement is a contributing factor in mortality risk for grizzly bears (Schwartz et al. 2012).

Environmental Baseline

The environmental baseline for grizzly bears is described in terms of those parameters that have the potential to affect grizzly bears either through human contact and conflict or through reductions in secure habitat. More specifically, parameters that address grizzly/human conflict (e.g., access management, appropriate food storage, livestock management, and vegetation management) form the basis against which threats to grizzly bears are measured. Activities listed in Appendix A that are “*not likely to adversely affect*” (NLAA) for grizzly bears are those that have insignificant or discountable effects because they are compatible with land management direction that has helped move the grizzly bear population towards recovery and that have food storage/attractant provisions that reduce potential human-bear conflicts.

Access Management

Roads and their associated human activities have a range of direct and indirect impacts on grizzly bears and their habitat. This includes habitat displacement, change in bear behavior, exposure to human foods, habitat loss and/or fragmentation, population fragmentation, and a source of indirect mortality risk (*as summarized by* MacHutchon and Proctor 2015). Consequently, human action on roads can negatively impact grizzly bear survival to reproduce and, ultimately, depress population productivity.

Many studies demonstrate that grizzly bears will generally avoid areas near open roads and avoid areas with high road densities (Mattson et al. 1987; McLellan and Shackleton 1988; Aune and Kasworm 1989, Mace and Manley 1993, Mace et al. 1996; Mace and Waller 1997; Wakkinen and Kasworm 1997; Wielgus et al. 2002; Schwartz et al. 2010; Boulanger and Stenhouse 2014). On multiple use landscapes⁴, Mace and Manley (1993) found that adult grizzly bears in the NCDE used habitat with open road densities greater than 1 mi/mi² less than expected. All sex and age classes of grizzly bears used habitat with total road densities greater than 2 mi/mi² less than expected. Wakkinen and Kasworms’ (1997) research in the SE and CYE observed similar responses by grizzly bears in these two populations. Grizzly bears generally adjust to disturbance associated with roads by avoiding the area which in results in a reduction in the amount of habitat available to the bears. Roads also provide increased access into previously remote areas which encourages human settlement, recreational use, hunting, and other land uses. These activities can increase the frequency of human-bear confrontations and ultimately impacts habitat availability through avoidance behavior by bears. Because spring habitat tends to be at lower elevations, increased potential exists for conflict between bears and humans due to greater access into those areas by humans (Servheen 1983). Roads located in riparian zones, for example, may result in indirect habitat losses.

Grizzly bear habitat across Region 1 is best described in terms of the availability of large tracts of relatively undisturbed land that provides some level of security from human depredation and

⁴ i.e. NFS lands experiencing active management outside wilderness or roadless areas.

competitive use of habitat by humans (including roading, logging, grazing, and recreation) (USDI 1993). To that end, habitat is often described in terms of core areas – areas free of motorized access during the non-denning period within the recovery zones (IGBC 1994; IGBC 1998). For example, the percentages of core area in a grizzly bear management unit (BMU) (CYE and SE) or BMU subunit (GYE and NCDE), as well as open and total road density, are important measurements in determining and understanding the extent of habitat security for grizzly bears within recovery zones or primary conservation areas (PCA) (for GYE and NCDE) (USDI Fish and Wildlife Service 2007 and 2011; NCDE Subcommittee 2018). Areas free of motorized access may also be considered for Section 7 effects analysis **outside** recovery zones and will be referred to as secure habitat.

Non-motorized trails and their use may also indirectly impact the amount of habitat available to grizzly bears. Multiple studies document disturbance of individual grizzly bears from non-motorized trails to varying degrees (Schallenberger and Jonkel 1980; Jope 1985; McLellan and Shackleton 1989; Kasworm and Manley 1990; Mace and Waller 1996; White et al. 1999; Donelon 2004; Coleman et al. 2013 and 2014). However, none of these studies documented significant effects. Disturbance merits concern because it can affect individual grizzlies through habitat loss and disrupted foraging or social behaviors. This may lead to increased energetic costs and decreases in nutritional intake to individual bears depending on a suite of factors including habitat quality, time of the year, sex and age of the bear, and level of human use in an area.

Food/Attractants Storage

Availability of human-related foods can attract bears and cause changes in bear behavior leading to habituated and/or food-conditioned bears. Human food, livestock feed, and garbage all increase the opportunity for grizzly/human conflicts. Oftentimes, habituated and/or food-conditioned bears become a threat to human life or property and are removed from the population or killed through management action (McLellan et al. 1999; Kasworm et al. 2018a and 2018b; Wells 2018; Jonkel 2019; Manley and Vallieres 2019; Sarmiento and Zielke 2019; IGBST 2020).

One of the most effective ways to prevent grizzly bear/human conflicts and increase grizzly bear survival on public lands is to require users and recreationists in grizzly habitat to store their food, garbage, and other bear attractants so that they are inaccessible to bears. Securing potential attractants can prevent bears from becoming food conditioned and displaying subsequent unacceptable aggressive behavior. Storing attractants in a manner that prevents bears from accessing them is effective in limiting grizzly bear mortality, grizzly bear/human encounters, and grizzly bear/human conflicts (IGBC 1986; USDI Fish and Wildlife Service 2011).

Livestock Grazing

Interactions between livestock and grizzly bears have historically led to the removal of grizzly bears. In several studies, livestock depredation was a leading cause for which a bear was removed and in several instances livestock depredation became a leading cause of non-hunting mortality (Thier and Sizemore 1981; Knight and Judd 1983; Knight et al. 1985; Aune and Stivers 1983). Most livestock depredations have involved sheep (Lee and Weaver 1981; Knight and Judd 1983); however, grizzly bear removals/mortalities due to cattle depredation have been reported and are on the rise in some locations where grizzly bear expansion intercepts with active grazing operations on public and private lands (Wells et al. 2018; Manley and Vallieres 2019; Sarmiento and Zielke 2019).

Grizzlies also feed on livestock carcasses (Servheen et al. 1981; Aune and Stivers 1983). Livestock carcasses may be scattered or deposited in “boneyards.” Improperly situated boneyards may function like garbage dumps, attracting bears to these areas, and increasing the likelihood of food-conditioning bears and thus increasing human/bear conflicts.

In the NCDE and GYE, most livestock depredations by grizzly bears occur on sheep or young cattle (Wells et al. 2018; Jonkel 2019; Manley and Vallieres 2019; Sarmiento and Zielke 2019). While grizzly bears frequently coexist with large livestock such as adult cattle without preying on them, their encounters with smaller animals (such as calves, domestic sheep, goats, or chickens) often result in depredation (Jonkel 1980; Knight and Judd 1983; Orme and Williams 1986; Anderson et al. 2002; Manley and Vallieres 2019; Sarmiento and Zielke 2019). Honeybees, classified as livestock in Montana (MCA 15-24-921), can also be attractants to some grizzly bears.

If repeated depredations occur, managers may relocate bears or remove them from the population. As such, areas with domestic livestock have the potential to become population sinks (Knight et al. 1988; Schwartz et al. 2010). Because of the increased risk to grizzly bears posed by actions taken to protect sheep and other small livestock, the IGBC Guidelines emphasized the reduction of these types of allotments. In contrast, there are a number of permitted grazing operations for horses and mules in the NCDE, primarily on National Forest land and generally associated with outfitter and guide operations or Forest Service administrative use. There is no evidence of conflict with bears due to attractants, depredation, or forage competition related to these horse and mule permitted operations. A number of regulations and practices (i.e. Forest Plan standards and guidelines) related to livestock allotments promoted grizzly bear recovery through minimization of bear-livestock and related bear-human conflicts (e.g. NCDE Subcommittee 2018).

Vegetation Management

If not implemented properly, vegetation management programs can negatively affect grizzly bears by (1) removing cover; (2) disturbing or displacing bears from habitat during the logging period; (3) increasing human/grizzly bear conflicts or mortalities as a result of unsecured attractants; and (4) increasing mortality risk or displacement due to new roads into previously roadless areas and/or increased vehicular use on existing restricted roads, especially if roads are open to the public after vegetation management is complete. Conversely, vegetation management may result in positive effects on grizzly bear habitat once the project is complete, provided key habitats such as riparian areas and known food production areas are maintained or enhanced. For instance, tree removal for thinning or timber harvest and prescribed burning can result in localized increases in bear foods through increased growth of grasses, forbs, and berry-producing shrubs (Zager et al. 1983; Kerns et al. 2004). These areas may provide important forage opportunities for grizzly bear populations, particularly in areas where fire suppression has altered the natural disturbance patterns (Ciarniello et al. 2015; Kearney et al. 2019).

Changes in the distribution, quantity, and quality of cover are not necessarily detrimental to grizzly bears as long as they are coordinated on a grizzly BMU or subunit scale to ensure that grizzly bear needs are addressed throughout the various projects occurring on multiple jurisdictions at any given time. Although there are known, usually temporary impacts to individual bears from timber management activities, these impacts have been managed acceptably using the 1986 IGBC Guidelines (Interagency Grizzly Bear Committee (IGBC) 1986), which were incorporated into all R1 Forest Service Land Management and Resource Plans in the 1980s. Under these Guidelines, grizzly bear populations

increased and recovered by following these two guiding principles: (1) maintain and improve habitat; and (2) minimize the potential for grizzly bear/human conflict (ibid).

Effects Analysis

The project types identified in Appendix A have been analyzed relative to the threats to grizzly bears identified in the above environmental baseline. The project types that have an initial determination of “*not likely to adversely affect*” meet all of the criteria listed below. Thus, effects to grizzly bears resulting from such projects would be insignificant and/or discountable.

- They occur during seasons and times when grizzly bear use is relatively low (i.e., projects are not scheduled to occur in important habitats during the Spring and/or Fall Period— as specified for each Grizzly Bear ecosystem if they are defined).
- They do not lead to a substantial net increase in non-motorized human access.
- They do not increase the chances of negative human-bear interactions.
- They do not involve permanent or long-lasting disturbance that could displace a bear from suitable habitat.
- They do not lead to a permanent net or substantial temporary increases in motorized access;
- They do not result in a loss or exchange of secure core habitat within recovery zones as defined under the Forest Plans (or Amendments).
- They do not increase the potential for bears to become habituated and conditioned to human-related attractants (i.e., livestock and their feed, garbage).

Projects with these features have minimal potential for adverse effects on grizzly bears through disturbance and displacement and human/grizzly conflict. Thus, as described in the environmental baseline section above, effects to grizzly bears resulting from such projects would be insignificant and/or discountable. Project types that do not incorporate these features may lead to adverse effects to grizzly bears and are not a part of this assessment.

Cumulative Effects Analysis

Implementation of projects that meet the screening criteria for a “*not likely to adversely affect*” determination should result in low to no cumulative effects to grizzly bears from reasonable foreseeably future actions on State and private lands located within the federal Action Area. Although there may be minor effects to individual bears due to implementation of the projects described herein, and effects from activities on non-federal lands may occur, grizzly bear recovery objectives should still be met.

Determination of Effects

Project effects will be documented relative to the screens in Appendix A, and those that would result in a “*not likely to adversely affect*” determination would receive programmatic concurrence from the Service.

Canada Lynx

Distribution

Lynx (*Lynx canadensis*) currently are found throughout Alaska and Canada (except arctic islands) south through the Rocky Mountains, northern Great Lakes Region, and northern New England. Lynx historically occurred in 16 states represented by five ecologically distinct regions: Cascade Range (Washington, Oregon), Northern Rocky Mountains (northeastern Washington, northeastern Oregon, Idaho, Montana, western Wyoming, northern Utah), Southern Rocky Mountains (southeastern Wyoming, Colorado), northern Great Lakes (Minnesota, Wisconsin, Michigan), and northern New England (Maine, New Hampshire, Vermont, New York, Pennsylvania, Massachusetts).

Resident populations currently exist only in Maine, Montana, Washington, and possibly Minnesota. They are considered extant, but no longer sustain self-supporting populations in Wisconsin, Michigan, Oregon, Idaho, Wyoming, Utah, and Colorado; they may be extirpated from New Hampshire, Vermont, New York, Pennsylvania, and Massachusetts (Ruediger, et al. 2000). The lynx was listed as threatened in 2000.

Life History

Canada lynx are medium-sized cats generally 30-35 inches long and weighing 18-23 pounds. They have large feet adapted to walking on snow, long legs, tufts on ears, and black-tipped tails (Ruediger, et al. 2000).

Lynx occur in boreal coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare (74 FR 8616-8696; McKelvey et al. 2000; Ruggiero et al. 2000). In North America, the distribution of lynx is nearly coincident with that of snowshoe hares. Lynx are uncommon or absent from the wet coastal forests of Canada and Alaska. Snowshoe hares are the primary prey of lynx, comprising 35-97% of the diet. Other prey species include red squirrel, grouse, flying squirrel, and ground squirrels, among others.

Southern populations of lynx may prey on a wider diversity of species than northern populations because of lower average hare densities and differences in small mammal communities; however, snowshoe hares are still their primary prey species. Squires indicated that lynx in western Montana prey almost exclusively on snowshoe hares during the winter (Squires et al. 2007). Squires located 86 lynx kills that included 7 prey species: blue grouse, spruce grouse, northern flying squirrel, red squirrel, snowshoe hare, least weasel, and white-tailed deer. Snowshoe hares contributed 96 percent of prey biomass (4-year average, range equals 94 to 99 percent). Red squirrels were the second most common prey (11 kills), but they only provided 2 percent biomass to the winter diet (Squires et al. 2007; Squires et al. 2010; 74 FR 8616-8696; Koehler et al. 1979; Koehler 1990). In areas characterized by patchy distribution of lynx habitat, lynx may prey opportunistically on other species that occur in adjacent habitats, potentially including white-tailed jackrabbit, black-tailed jackrabbit, sage grouse, and Columbian sharp-tailed grouse (Lewis and Wenger 1998).

The home range size of a snowshoe hare is 5–10 ha (12–25 ac); estimates vary depending on the sampling method (e.g., live-trapping vs. radio telemetry) (Keith 1990; Hodges 2000a; Murray 2003 in Interagency Lynx Biology Team 2013). Although hares are non-migratory and generally occupy the same area throughout the year, short-distance seasonal movements between winter and summer foraging

areas have been documented (Adams 1959; Bookhout 1965; Wolff 1980; Wolfe et al. 1982 *in* Interagency Lynx Biology Team 2013). Lynx densities vary across the southern periphery of its range and may be linked to snowshoe hare density and abundance (Interagency Lynx Biology Team 2013). Generally, home ranges in the western United States are larger than those reported from the eastern United States or from northern Canada during peaks in snowshoe hare abundance (Aubry et al. 2000).

Both snow conditions and vegetation type are important factors to consider in defining lynx habitat. Across the northern boreal forests of Canada, snow depths are relatively uniform and only moderately deep (total annual snowfall of 39-50 inches) (Kelsall et al. 1977). Snow conditions are very cold and dry. In contrast, in the southern portion of the range of the lynx, snow depths generally increase, with deepest snows in the mountains of southern Colorado. Snow in southern lynx habitats may be subjected to more freezing and thawing than in the taiga (Buskirk et al. 2000) although this varies depending on elevation, aspect, and local weather conditions. Crusting or compaction of snow may reduce the competitive advantage that lynx have in soft snow, with their long legs and low-foot loadings. At lower snow depths there is an increase in competition for prey and an increase in potential predation on lynx.

Most lynx occurrences in the western United States were associated with Rocky Mountain conifer forests and most were within the 4920- to 6560-foot elevation zone. In Squires' northwest Montana study area, lynx used mid- to high-elevation forests during winter (range = 4134 to 7726 feet, mean = 5715 feet) and slightly higher elevations during summer (Squires et al. 2010). There is a gradient in the elevational distribution of lynx habitat from the Northern to the Southern Rocky Mountains, with lynx habitat occurring at 8000-11500 feet in the Southern Rockies.

In southwest Montana (in portions of the Gallatin, Custer, and Beaverhead-Deerlodge Forests of the GYE) both boreal forest and snowshoe hares are relatively scarce and distributed in a more patchy fashion, compared to northwestern Montana (Hodges et al. 2009). Spruce-fir and mixed spruce-fir with mature lodgepole pine stands (having dense understory and high degree of horizontal cover) supported the highest densities of snowshoe hares in Yellowstone National Park (YNP) (Hodges and Mills 2005). Researchers were able to determine the presence of 3 individual lynx, including 2 kittens born in different years in YNP, but only within the East Zone where andesitic soils supported moist spruce-fir forests with dense understories (Murphy et al. 2006). They concluded that habitat for lynx in YNP is patchy and that lynx in this part of their range use extensive exploratory movements (Squires et al., 2003). They also found that lynx are more likely to prey on alternative species. In western Wyoming, researchers found that snowshoe hare densities were highest in mature multistoried stands with high horizontal cover, but they also found relatively high hare densities in 30-70 year old lodgepole pine stands with high stem densities (Berg et al. 2012). The latter type is relatively short-lived compared to multi-storied habitats. They found few hares in young lodgepole forests where stem densities were low. They also found few hares in mixed whitebark pine-spruce-fir habitats. Relative to fire, Hodges and Mills (2005) noted that fire initially destroys habitat for hares and lynx, but that the high tree density of the forest as it reinitiates is the critical factor to producing good snowshoe hare and lynx foraging habitat (Hodges and Mills 2005).

Primary vegetation that contributes to lynx habitat is lodgepole pine, subalpine fir, and Engelmann spruce (Aubry et al. 2000; Vanbianchi et al. 2017; Holbrook et al. 2019). In extreme northern Idaho, northeastern Washington, and northwestern Montana, cedar-hemlock habitat types may also be considered primary vegetation. In central Idaho, Douglas-fir on moist sites at higher elevations may also be considered primary vegetation. Secondary vegetation, when interspersed within subalpine forests, which may also contribute to lynx habitat, includes cool, moist Douglas-fir, grand fir, western larch, and

aspen forests. Dry forest types (e.g., ponderosa pine, Douglas-fir, or lodgepole pine with a grass-like understory) do not provide lynx habitat (Squires 2010).

Based on examination of historical and recent evidence, the 2005 Canada lynx recovery outline categorized lynx habitat and occurrence within the contiguous United States as either core areas, secondary areas, or peripheral areas (U.S. Fish and Wildlife Service 2005). The areas with the strongest long-term evidence of the persistence of lynx populations within the contiguous United States are defined as “core areas.” Core areas have both persistent verified records of lynx occurrence over time and recent evidence of reproduction. At this time, the role of areas outside of these core areas (secondary and peripheral) in sustaining lynx populations in the contiguous United States is unclear. The fluctuating nature of lynx population dynamics and the ability of lynx to disperse long distances have resulted in many individual occurrence records outside of core areas, without accompanying evidence of historic or current presence of lynx populations. Areas classified as “secondary areas” are those with historical records of lynx presence with no record of reproduction; or areas with historical records and no recent surveys to document the presence of lynx and/or reproduction. If future surveys document presence and reproduction in a secondary area, the area could be elevated to core. Secondary areas may contribute to lynx persistence by providing habitat to support lynx during dispersal movements or other periods, allowing animals to then return to “core areas.” In “peripheral areas” the majority of historical lynx records is sporadic and generally corresponds to periods following cyclic lynx population highs in Canada. There is no evidence of long-term presence or reproduction that might indicate colonization or sustained use of these areas by lynx. However, some of these peripheral areas may provide habitat enabling the successful dispersal of lynx between populations or subpopulations. Based on historical lynx occurrence information (McKelvey et al. 2000b), recent research (e.g., Hoving 2001; von Kienast 2003; Squires et al. 2003; Maletzke 2004; Fuller et al. 2007; Burdett 2008; Koehler et al. 2008; Vashon et al. 2008a; Devineau et al. 2010; and Squires et al. 2010 *in* Interagency Lynx Biology Team 2013), and results from the National Lynx Survey (K. McKelvey, unpublished data *in* Interagency Lynx Biology Team 2013), as well as snow-tracking surveys, evidence of persistence and reproduction of lynx in the core areas has been confirmed.

As explained in the Canada Lynx Conservation Assessment and Strategy (LCAS) (Interagency Lynx Biology Team 2013), a core area contains large, connected patches of boreal forest encompassing at least 480 mi². The term boreal forest is used here to include the true boreal forest, which is a zone extending south of the arctic tundra, as well as the southern transitional regions as described by Agee (2000) for the Northeastern and Great Lakes Regions (eastern hardwoods and temperate and boreal conifers) and the western United States (subalpine forests)(Interagency Lynx Biology Team 2013). Lynx Geographic Areas have been substantially revised to incorporate new information about lynx and lynx habitat. The map (Fig. 3.1 *in* Interagency Lynx Biology Team 2013) has also been updated (Interagency Lynx Biology Team 2013, p. 1- Chapter 3). All of the core areas, secondary areas, and peripheral areas identified in the recovery outline (U. S. Fish and Wildlife Service 2005) are encompassed within the five geographic areas (Fig. 3.1). As new information continues to be developed, the delineations may be modified (Interagency Lynx Biology Team 2013).

Within the boreal forest, lynx foraging habitat supports lynx primary prey (snowshoe hare) and has the vegetation structure suitable for lynx to capture prey. Dense saplings or mature multi-layered stands are the conditions that maximize availability of food and cover for snowshoe hares at varying snow depths throughout the winter (Interagency Lynx Biology Team 2013). Natural disturbance processes that create early successional stages exploited by snowshoe hares include fire, insect infestations, wind throw, and disease outbreaks (Plate 2.15 *in* Interagency Lynx Biology Team 2013; Kilgore and Heinselman 1990; Veblen et al. 1998; Agee 2000 *in* Interagency Lynx Biology Team 2013). Both timber

harvest and natural disturbance processes provide foraging habitat for lynx when the resulting stem densities and stand structure meet the habitat needs of snowshoe hare (Plate 2.16 in Interagency Lynx Biology Team 2013; Keith and Surréndi 1971; Fox 1978; Conroy et al. 1979; Wolff 1980; Parker et al. 1983; Litvaitis et al. 1985; Bailey et al. 1986; Monthey 1986; Koehler 1990*a, b* in Interagency Lynx Biology Team 2013). Lynx appear to achieve maximum foraging efficiency at the edge habitat between mature and dense, regenerating stands where higher densities of snowshoe hares are more vulnerable to predation, a slightly different habitat configuration than is associated with most home range models (Griffin and Mills 2009; Trainor et al. 2014; Ivan and Shenk 2016; Holbrook et al. 2019).

In the western United States, development of a high density (>4,500 stems/acre) of young conifer stems and branches protruding above the snow was found to provide foraging habitat for lynx within about 10–40 years following disturbance, depending on site productivity, forest type and intensity of disturbance (Sullivan and Sullivan 1988; Koehler 1990*a* in Interagency Lynx Biology Team 2013). This habitat is temporary, as the tree stems and branches eventually grow out of reach of snowshoe hares and shade out understory saplings and shrubs. Mature multi-story conifer forests with low limbs and containing a substantial understory of young trees and shrubs provide stable lynx foraging habitat (Murray et al. 1994; Koehler et al. 2008; Squires et al. 2010; Ivan 2011*a*). In north central Washington, high snowshoe hare densities (0.4 hares/ac) were associated with sapling (<4 in dbh) densities of 1,127±114 stems/ac and medium-sized (4–11 in dbh) tree densities of 288±32 stems/ac (Walker 2005 in Interagency Lynx Biology Team 2013). In western Wyoming, high hare abundance was associated with late seral multi-story forest including a spruce-fir component as well as dense, 30-70 year-old lodgepole pine (Berg et al. 2012), and across the northern Rockies, Holbrook et al. (2017) found that the probability of hare occupancy increased by 20% for every 10% increase in horizontal cover. Holbrook et al. (2017) reported that the highest hare densities were associated with plots averaging 225 trees per acre (range 194-256), 67% canopy cover (range 64-71), and 64 ft²/ac basal area (range 55-72).

Landscapes containing a mix of forest age classes are more likely to provide lynx foraging habitat throughout the year (Poole et al. 1996; Griffin and Mills 2004; Squires et al. 2010). Winter habitat may be more limiting for lynx (Squires et al. 2010). In winter, lynx do not appear to hunt in openings, where lack of cover limits habitat for snowshoe hares (Mowat et al. 2000; Maletzke et al. 2008; Squires et al. 2010). Squires (2010) found that when lynx did cross openings, they remained closer to forest edges compared to random tracks, with an average distance of 384 feet from the forest edge. Areas with recent timber harvest and areas recently burned can contribute herbaceous summer foods for snowshoe hares, and woody winter browse will develop on older sites (Fox 1978 in Interagency Lynx Biology Team 2013). Multi-story stands may provide a greater availability of browse as snow depths vary throughout the winter (Interagency Lynx Biology Team 2013).

Stem density and snowshoe hare density are directly and positively correlated (Conroy et al. 1979; Sullivan and Sullivan 1988; Koehler 1990*b*; Koehler and Brittell 1990; Thomas et al. 1997; Hodges 2000*a*; Mowat et al. 2000; Homyack et al. 2006 in Interagency Lynx Biology Team 2013; Holbrook et al. 2017). Stands may continue to provide suitable snowshoe hare habitat for many years until woody stems in the understory become too sparse, as a result of undisturbed forest succession or management (e.g., clear-cutting or thinning)(USDI 2009 74 FR p. 8637).

Denning habitat is the environment lynx use when giving birth and rearing kittens until they are mobile, and it occurs at several spatial scales: den site, stand, and the surrounding “core use area”. The most common component of den sites is large amounts of coarse woody debris to provide escape and thermal cover for kittens. Den sites typically are situated within older regenerating stands (>20 years since disturbance) or in mature conifer or dense regenerating mixed conifer-deciduous (typically

spruce/fir or spruce/birch) forests (Koehler 1990a; Slough 1999; Moen et al. 2008; Organ et al. 2008; Squires et al. 2008). The availability of den sites does not appear to be limiting (Gilbert and Pierce 2005; Moen et al. 2008; Organ et al. 2008; Squires et al. 2008).

Stand structure appears to be more important than forest cover type (Mowat et al. 2000). In Montana, Squires found that lynx located their dens in a variety of forest stand types. Eighty percent of dens were in mature forest stands and 13 percent in mid-seral, regenerating stands. Young stands that were either naturally sparse or mechanically thinned were seldom used for denning, while lynx denned more often along the edges of regenerating forests where trees had blown down into jack-strawed piles of woody debris.

Kosterman et al. (2018) quantitatively summarized the characteristics of core denning areas associated with successful reproduction. The authors reported that forest characteristics associated with increased denning success included abundant and connected mature forest, intermediate amounts of small-diameter regenerating forest. Holbrook et al. (2019) extended this analysis, finding that the core use denning areas of the most fecund female lynx contained 17% more mature forest, arranged in 2.25-times larger patches, than less fecund females. The authors suggested that a high-quality territory for a breeding female lynx would include 50% -60% mature forest and approximately 20% advanced regenerating forest. This aligns with previous work which suggests that the juxtaposition of mature and regenerating forest provides the most efficient hunting opportunities for lynx (Holbrook et al. 2017b).

At a landscape level, dens were generally in concave or drainage-like topographies and often on northeast aspects. Squires found that denning habitat is generally abundant across the coniferous forested landscape, especially in riparian habitats and in areas where insect or disease kills patches of trees. Given the large home ranges and low den site fidelity of lynx, den sites are not likely to be limiting (Squires et al. 2008).

Response to Habitat Disturbance

Vegetation management that promotes high stem density and dense horizontal cover can increase snowshoe hare densities (Keith and Surrind 1971; Fox 1978; Conroy et al. 1979; Wolff 1980; Parker et al. 1983; Livaitis et al. 1985; Bailey et al. 1986; Monthey 1986; Koehler 1990a, b; Fuller et al. 2007; Robinson 2006; Homyack et al. 2007; Scott 2009; McCann and Moen 2011). Where the objective is to provide snowshoe hare habitat by creating additional early successional forest conditions, management considerations include selecting areas that are capable of, but not currently providing, dense horizontal cover (e.g., stem exclusion structural stage), designing the appropriate size and shape of treatment units, retaining coarse woody debris, and maintaining high stem densities in regenerated forests (Koehler and Brittell 1990; Homyack et al. 2004; Bull et al. 2005; Fuller and Harrison 2005; Ivan 2011a in Interagency Lynx Biology Team 2013). When the objective is to increase the amount or connectivity of mature, multistory stands, using small patch regeneration techniques to mimic forest gap dynamics and allow light penetration to the forest floor may help minimize impact to snowshoe hares (Hodson et al. 2010; Kumar et al. 2018) while providing long-term benefits (Allard-Duchene et al. 2014; Thorton et al. 2012; Holbrook et al. 2017). Regardless of the objective, emulating natural disturbances and promoting management activities that result in high area-edge ratios may help facilitate post-management use by lynx (Vanbianchi 2015). However, Holbrook et al. (2018) noted that it took lynx up to 20 years to begin using post-management sites regularly, although thinning treatments were used sooner than regeneration or selection harvests.

Lynx appear more willing to use post-fire landscapes than previously thought, although their use depends on the presence of unburned refugia, fire skips, or other residual vegetation (Vanbianchi et al. 2017) and reflects efforts to travel between higher quality habitat rather than focused use (Vanbianchi et al. 2017b). This behavior highlights the importance of retaining post-fire vegetation structure in areas that are important for lynx habitat connectivity (Vanbianchi 2015) and recognizing that lower quality habitats may be used as corridors between higher quality patches (Vanbianchi et al. 2018).

Environmental Baseline

Based on current knowledge of the life history, biology, and ecology of lynx, certain elements are thought to be important to the conservation of the species, as described above. These elements are described in the Northern Rockies Lynx Management Direction (USDA FS 2007), NRLMD FEIS (USDA FS 2007), the NLRMD BA (USDA 2007), NRLMD BO (USDI 2007), the Primary Constituent Element (PCE) in the most recent critical habitat designation (Federal Register /Vol.79, No. 117/Friday, September 12, 2014/Final Rule), as well as in the LCAS (Interagency Lynx Biology Team 2013). The environmental baseline for lynx is described in terms of those parameters that: (1) may affect lynx foraging by reducing the abundance and distribution of their primary prey (snowshoe hares); and (2) may impede lynx movement between patches of boreal forest through loss of connectivity within core habitat (for example, new highways or large developments), or through human activities that may either directly or indirectly result in lynx mortality.

Vegetation Alteration

The Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013) includes the following recommended conservation measures for vegetation management in core areas:

- Provide a mosaic that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story coniferous stands to produce the desired snowshoe hare density within each LAU (Plate 5.2 *in* Interagency Lynx Biology Team 2013).
- Use fire and mechanical vegetation treatments as tools to maintain a mosaic of lynx habitat, in varying successional stages, distributed across the LAU in a landscape pattern that is consistent with historical disturbance processes.
- Design vegetation management to develop and retain dense horizontal cover. Focus treatments in areas that have the potential to improve snowshoe hare habitat by developing dense horizontal cover in areas where it is presently lacking. In areas of young, dense conifers resulting from fire, timber harvest or other disturbance, do not reduce stem density through thinning until the stand no longer provides low, live limbs within the reach of hares during winter (e.g., self-pruning processes in the stem exclusion structural stage have eliminated snowshoe hare cover and forage availability during winter conditions with average snowpack). If studies are completed that demonstrate that thinning can be used to extend the duration of time that snowshoe hare habitat is available (e.g., by maintaining low limbs), then earlier thinning could be considered.
- Retain mature multi-story conifer stands that have the capability to provide dense horizontal cover (Plate 5.3 *in* Interagency Lynx Biology Team 2013). If portions of these stands currently

lack dense horizontal cover, focus vegetation management practices (such as group selection harvest) in those areas to increase understory density and improve snowshoe hare habitat.

- In order to maintain the amount and distribution of lynx foraging habitat over time, manage so that no more than 30% of the lynx habitat in an LAU is in an early stand initiation structural stage (i.e., does not provide winter snowshoe hare habitat). Emphasize sustaining snowshoe hare habitat in an LAU. If more than 30% of the lynx habitat in an LAU does not provide winter snowshoe hare habitat, no further increase as a result of vegetation management projects should occur on federal lands.
- Recognizing that natural disturbances and forest management of private lands also will occur, management-induced change of lynx habitat on federal lands that creates the early stand initiation structural stage should not exceed 15% of lynx habitat on federal lands within a LAU over a 10-year period.
- Conduct a landscape evaluation to identify needs or opportunities for adaptation to climate change. Consider potential changes in forest vegetation that could occur as a result of climate change (e.g., Gärtner et al. 2008 *in* Interagency Lynx Biology Team 2013). Identify reference conditions relative to the landscape's ecological setting and the range of future climate scenarios. For example, the historical range of variability could be derived from landscape reconstructions (e.g., Hessburg et al. 1999; Blackwell et al. 2003; Gray and Daniels 2006 *in* Interagency Lynx Biology Team 2013).
- Design harvest units to mimic the pattern and scale of natural disturbances and retain natural connectivity across the landscape.
- In aspen stands, maintain native plant species diversity including conifers.
- Recruit a high density of stems, generally greater than 1,862/ac, of conifers, hardwoods, and shrubs, including species that are preferred by hares.
- Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.
- When designing fuels reduction projects, where possible retain patches of untreated areas of dense horizontal cover within treated areas.

The Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013) includes the following recommended conservation measures for vegetation management in secondary/peripheral areas:

- Provide a mosaic of forest structure that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story conifer stands. Flexibility in the amounts and arrangement of various successional stages is acceptable, provided that a mosaic can be sustained. Vegetation treatments should be designed with consideration of historical landscape patterns and disturbance processes.
- Design timber harvest, planting, and thinning to include some representation of young densely-stocked regenerating stands in the mosaic for snowshoe hare production areas.

Fire management also plays a critical role in the availability of lynx habitat. Wildfire is not thought to be a threat to lynx, and often results in beneficial effects when burned areas regenerate into lynx foraging

habitat. Natural fire plays an important role in creating the mosaic of vegetation patterns, forest stand ages, and structure that provide good lynx and snowshoe hare habitat, particularly in the western Great Lakes Region and in the western mountain ranges of the United States (Agee 2000, pp. 47–56 *in* Federal Register/Vol. 74, No. 36/Wednesday, February 25, 2009/Rules and Regulations, p. 8619). Fire suppression over a period of about 60 years altered vegetation mosaics and may have reduced snowshoe hare habitat. However, in recent decades, widespread fires in some western areas have increased hare habitat. In Glacier National Park, a study assessed hare pellet densities in areas of dense lodgepole pine saplings that regenerated following wildfire, compared to unburned sites. Twenty years after the fire, they found significantly higher hare pellet densities in stands with high sapling density as well as high forest edge (Cheng et al. 2011 *in* Interagency Lynx Biology Team 2013). Impacts of fire suppression are greatest in areas of low- to mid-intensity fire regimes (Quigley et al. 1996 *in* Interagency Lynx Biology Team 2013). Prescribed burns may also improve lynx habitat, provided they maintain or recruit woody debris that provides cover and denning habitat.

Habitat Outside of LAUs

The Northern Rockies Lynx Management Direction (NLRMD) (USDA Forest Service 2007) and the LCAS (Interagency Lynx Biology Team 2013) outlined a number of criteria to represent important life history characteristics (foraging and denning) that should be considered in the mapping of lynx habitat. Additional guidance was provided based on recommendations by the Lynx Steering Committee. The Lynx Steering Committee developed a set of mapping criteria and procedures to guide and clarify the mapping process. The consequences of applying these criteria were also assessed. Once lynx habitat was calculated, it was delineated into management areas (LAUs) that contain suitable lynx habitat in sufficient quantities and juxtaposition to other lynx habitats and were designed to approximate the size of a female home range (Ruediger et al. 2000).

In some geographic areas, lynx habitat is naturally patchy and can be of marginal quality, providing suitable habitat that is noncontiguous and fragmented. In such areas, lynx use extensive exploratory movements (Squires et al. 2003). The utility to lynx of habitat patches that are not of a sufficient amount to comprise a LAU is unknown. The value of smaller patches of habitat could be determined by factors such as size of the patch, quality of the habitat (in terms of foraging opportunities), the spatial arrangement of the patches (within daily movement distance and proximity to other habitat blocks), and the increase in energetic costs of using such habitat. In addition, there are potential differences in the habitat needs of a breeding female versus a transient or dispersing lynx in terms of habitat distribution and size of area used by an individual lynx.

Areas classified as “secondary areas” in the 2005 Canada lynx recovery outline (USDI Fish and Wildlife Service 2005) are thought to contribute to lynx persistence by providing habitat to support lynx during dispersal movements or other periods, allowing animals to then return to core areas. Areas classified as “peripheral areas” may provide habitat enabling successful dispersal of lynx between populations or subpopulations. Unlike “core areas” neither of these areas show evidence of historic or current presence of persistent lynx populations or recent evidence of reproduction but do contain individual occurrence records of lynx. The role of secondary and peripheral areas in sustaining lynx populations is unclear. However, given the fluctuating nature of lynx population dynamics and the ability of lynx to disperse long distances, habitat patches that are too small or too dispersed to provide a home range to a breeding female may still contribute to the survival of dispersing or transient lynx temporarily residing in an area, and help to maintain connectivity between suitable habitats.

It is possible that activities listed in Table B1 or B2 could impact noncontiguous habitat outside of LAUs. Effects to these habitat patches would not impact the ability of a lynx to establish a home range within a delineated LAU. As long as there is sufficient adjacent habitat available for lynx to avoid the area, and to allow lynx movements around the action area and to avoid forest openings, suitable conditions for lynx would not be considerably impacted.

Human Activity and Development

Some human activities such as development of reservoirs or highways with high-speed and high-traffic volumes may impede lynx movement or increase lynx mortality (Ruediger et al. 2000). Although many species of wildlife are disturbed when forest roads are used (Ruediger 1996) preliminary information suggests lynx do not avoid roads (Ruggiero et al. 2000) except at high-traffic volumes (Apps 2000). Along less-traveled roads where the vegetation provides good hare habitat, sometimes lynx use the roadbeds for travel and foraging (Koehler and Brittell 1990). An analysis on the Okanogan National Forest in Washington showed lynx neither preferred nor avoided forest roads, and the existing road density did not appear to affect lynx habitat selection (McKelvey et al. 2000; USDI FWS 2000).

In the Northern Rockies, lynx occupy dens in early May when many forest roads are still impassable by wheeled vehicles due to persistent snowdrifts and wet, muddy roads; snowmobiles no longer use the roads because of intermittent and unpredictable availability of sufficient snow (Squires et al. 2008). Squires concluded that lynx did not avoid the subset of roads that were open to wheeled vehicle travel. Rather, the observed avoidance of roads was more a function of the correlation of roads and landscape pattern; fewer roads were located in denning habitat and higher road density occurred along forest edges and in managed stands (Squires et al. 2010).

Disturbance

Few studies have examined how lynx react to human presence. Some anecdotal information suggests that lynx are generally tolerant of humans, although given differences in individuals and contexts, a variety of behavioral responses to human presence may be expected (Staples 1995, Mowat et al. 2000 *in* Interagency Lynx Biology Team 2013). In Colorado, Olson et al. (2018) compared the impacts to lynx from developed and dispersed motorized and non-motorized winter recreation. They found that lynx did not exhibit strong negative responses to dispersed recreation, although they did alter their behavior and temporal patterns in a nuanced response. Lynx seemed tolerant of back-country and packed-trail skiing, but they generally avoided areas of greater snowmobile recreation intensity. At large developed ski resorts, noted to include considerable infrastructure, tree removal, continuous maintenance, and intense recreational activity, Olson et al. found that lynx appeared to substantially avoid the skied area and to adjust their activity to avoid high traffic times. They concluded there may be a threshold of human disturbance above which lynx cannot coexist with winter recreation and cited other findings where winter recreation may cause increased energy expenditure and lost hunting opportunities for lynx.

Implementation of various vegetation management treatments, grazing, road maintenance, or other activities listed in Table B1 or B2 may result in negligible, short-term direct effects to lynx related to disturbance, in the form of increased noise levels, use of mechanized equipment, vibrations, or other disturbances associated with increased human presence and activities. Direct effects could be related to disturbance to individual lynx, causing lynx to avoid perceived threats associated with human and equipment presence and increased noise during project activities. However, these actions are expected to result in minimal responses of temporary and insignificant potential avoidance behaviors. These effects are not considered a significant disruption to lynx behavior. No anticipated risks of direct

mortality or long-term impacts to the population are expected. However, such activities occurring in proximity to known active lynx dens could cause more significant disturbance and should undergo standard consultation.

With respect to snow compaction due to human activities, Kolbe was able to directly measure relationships between coyotes, compacted snow routes and snowshoe hare in an area that also supports a lynx population (USDI FWS 2007). Kolbe and others (2007) suggested that compacted snow routes did not appear to enhance coyotes' access to lynx and hare habitat, and so would not significantly affect competition for snowshoe hares. After evaluating Bunnell *et al.* (2006, entire) and Kolbe *et al.* (2007, entire), the USFWS determined that the best information available did not indicate that compacted snow routes increase competition from other species to levels that adversely impact lynx populations (CH FR 2009, p. 8639) and therefore, such activities would result in effects that are insignificant to lynx.

Lynx mortality can be caused by trapping or shooting, predation (especially by mountain lions during the snow-free season), and starvation (Squires *et al.* 2006). Historically, lynx populations in Montana were affected by trapping, but lynx trapping is now closed, although incidental harvest still occurs.

Effects Analysis

The project types identified in Appendix B have been analyzed relative to the effects to lynx identified in the above environmental baseline. The project types have an initial determination of "*not likely to adversely affect*" and have one or more of the features listed below [Interagency Lynx Biology Team 2013; NRLMD BA (USDA 2007); NRLMD BO (USDA 2007)]. Thus, effects to Canada lynx resulting from such projects would be insignificant and/or discountable.

- The project does not impact snowshoe hare habitat.
- The project does not remove vegetation if more than 30% of lynx habitat in an LAU is in an early stand initiation structural stage that does not yet provide hare habitat.
- The project does not remove vegetation if more than 15% of Forest Service lands in an LAU have been regenerated in the last 10 years.
- If the project salvages burned or dead trees, tree removal occurs in areas that do not provide food or cover for snowshoe hares. It is recommended that a sufficient number of dead trees be retained to provide potential lynx denning habitat.
- The project does not involve highway construction or permanent road upgrades associated with increases in traffic speed or volume.
- Project routes and any associated maintenance would not significantly increase the traffic speed or volume on forest roads in the long term (i.e. project implementation).
- The project does not involve permanent road construction or new snowmobile access in new areas which could lead to an increase in incidental trapping of lynx.
- If project impacts denning habitat, denning habitat is not limiting within the action area.
- The project involves special uses or recreation uses at previously developed sites.
- If located in a ski area, activities do not impact current or potential snowshoe habitat and are located within the existing permitted area.
- The project does not impede lynx movement and does not reduce habitat connectivity in identified linkage areas (Interagency Lynx Biology Team 2013; Squires 2013).

Cumulative Effects Analysis

Implementation of projects that meet the screening criteria for a “*not likely to adversely affect*” determination should result in low to no cumulative effects to Canada lynx from reasonably foreseeable future actions on State and private lands located within the federal Action Area. Although there may be minor effects to individual lynx due to implementation of the projects described herein and impacts from activities on non-federal lands may occur, the conservation objectives for lynx and lynx core habitat as identified in the LCAS (Interagency Lynx Biology Team 2013) should be met.

Determination of Effects

Project effects will be documented relative to the screens for Canada lynx in Appendix B and those that would result in a “*not likely to adversely affect*” determination would receive programmatic concurrence from the Service.

Canada Lynx Critical Habitat

The sections above for lynx life history and the environmental baseline are based upon the best available science, compiled in the LCAS (Interagency Lynx Biology Team 2013). This science is also applicable to designated lynx critical habitat, discussed below. The factors listed under the environmental baseline for Canada lynx critical habitat are based upon areas designated in the 2009 final rule (74 FR 2009 pp. 8615-8702) and apply to the more recent update in 2014.

Distribution

The final rule for critical habitat was published in the Federal Register on February 25, 2009, and became effective a month later on March 27, 2009. Five Critical Habitat Units (CHUs) were designated, two of which occur in the Northern Region. Unit 3 includes northwestern Montana and a small part of northeastern Idaho. This CHU is important to lynx conservation because lynx are widely distributed, breed in many locations, and occur in the highest density in this part of the Northern Rockies. Unit 5 is located in Yellowstone National Park in southwestern Montana (portions are also located in Wyoming, but Wyoming is not part of the Northern Region). Lynx habitat in Unit 5 is marginal by nature and snowshoe hare habitat is very fragmented. Lynx home ranges are therefore larger, and lynx depend more on matrix habitat. Fire and road-building projects undergo special management in Unit 5 (74 FR p. 8643).

History

Critical habitat for lynx was first designated in the Federal Register on November 9, 2006. National Forest lands were not designated initially, because it was thought these lands already provided management protection for lynx. On July 20, 2007, the rule underwent review after questions were raised on the scientific integrity and legal merit of the designation. Revision was deemed appropriate, and on February 28, 2008, the Service announced the proposed revised designation. The proposed designation added an additional 40,913 mi² to the existing critical habitat designation. Lynx critical habitat was further revised in 2014 (Federal Register /Vol.79, No. 117/Friday, September 12, 2014/Final Rule), resulting in relatively minor adjustments to critical habitat on National Forest System lands due to better mapping data. This revision resulted in a total of 38,954 square miles of Canada lynx critical habitat, of which 60% is on Federal lands.

Critical habitat is defined in Section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. Not all locations with records of lynx presence are essential for the conservation of the species; lynx are a wide-ranging species, and areas containing periodic records that lack evidence of reproducing populations are not considered essential to the species (74 FR pg. 8618).

The Primary Constituent Element (PCE) identified in the critical habitat final rule (USDI 2009; 74 FR pp. 8638-8639) comprises the essential features of the boreal forest types that provide, for example, prey, reproduction and denning habitat, and snow conditions that give lynx their competitive advantage. Within the geographical area occupied by the lynx at the time of listing, the USFWS identified the physical and biological features that are essential to the conservation of the species and that may require special management considerations or protections. The physical and biological features are PCEs laid out in a specific quantity and spatial arrangement to be essential to the conservation of the species. Based on the above needs and the current knowledge of the life history, biology, and ecology of the species, the USFWS determined that the PCE for lynx critical habitat is:

1. Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:

- a. Presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multi-storied stands with conifer boughs touching the snow surface;
- b. Winter snow conditions that are generally deep and fluffy for extended periods of time;
- c. Sites for denning that have abundant coarse woody debris, such as downed trees and root wads;
- d. Matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

Environmental Baseline

The designation of critical habitat by itself does not achieve conservation or recovery of a species, nor does it prohibit development or forest management activities that alter snowshoe hare habitat. The Act does not automatically restrict all uses of critical habitat, but only imposes restrictions under Section 7(a)(2) on Federal agency actions that may result in destruction or adverse modification of critical habitat (74 FR pp. 8621-8622). At the landscape scale within each CHU, natural and human-caused disturbance processes (e.g., fire, wind, insect infestations and forest management) influence the spatial and temporal distribution of lynx populations by affecting the PCE, as described in previous sections of this document. Portions of critical habitat units that did not contain the PCE, or where development was concentrated, were removed from the final designation. Any developed areas, and the land on which structures are located inside critical habitat boundaries, are excluded from critical habitat designation as described in the final rule (74 FR p. 8624).

Based on current knowledge of the life history, biology, and ecology of lynx, certain elements are thought to be important to the conservation of designated critical habitat, as described above. These elements are described as PCE in the critical habitat designation (Federal Register /Vol.74, No. 36/Wednesday, February 25, 2009/Final Rule), as well as in the LCAS (Interagency Lynx Biology Team

2013). The environmental baseline for lynx critical habitat is described in terms of those parameters that: (1) may affect the abundance and distribution of snowshoe hares –PCE 1a; (2) may affect desirable winter snow conditions (deep, fluffy snow for extended periods of time) – PCE 1b; (3) may alter potential denning sites having abundant coarse woody debris – PCE 1c; and (4) may impede lynx movement between patches of boreal forest through loss of connectivity within core habitat (for example, new highways or large developments), or through human activities that may either directly or indirectly result in lynx mortality – PCE 1d. Projects that result in a reduction of PCE 1a or that result in permanent loss or conversion of the boreal forest and may lead to adverse effects to lynx critical habitat are not a part of this assessment.

Vegetation Alteration

The conservation measures and guidelines described above and in the LCAS (Interagency Lynx Biology Team 2013) regarding vegetation management in core areas are applicable to critical habitat and address the PCE and its four components.

Human Activity and Development

Human activities such as development of reservoirs or highways with high-speed and high-traffic volumes may impede lynx movement or increase lynx mortality in both boreal forest types as well as matrix habitats.

Effects Analysis

The project types identified in Appendix D have been analyzed relative to the threats to designated Canada lynx critical habitat as identified in the above environmental baseline. The project types that have an initial determination of “*not likely to adversely affect*” have one or more of the features listed below. Thus, effects to designated Canada lynx critical habitat resulting from such projects would be insignificant and/or discountable.

PCE 1a - Snowshoe Hare Habitat

Vegetation alternation that does not affect existing snowshoe hare habitat and that complies with the conservation measures for vegetation management listed above (Interagency Lynx Biology Team 2013) would not result in effects to PCE1a.

PCE 1b – Deep Fluffy Snow

Forest actions typically do not influence the overall winter conditions that provide and maintain deep fluffy snow for extended periods of time (PCE 1b), as such conditions are a function of topography and climate. Any short-term effects to localized conditions providing PCE 1b are likely to be insignificant or discountable.

.

PCE 1c - Sites for Denning

Vegetation alteration that does not affect potential denning habitat within the boreal forest, or that occurs in LAUs where denning habitat is not limited, and has insignificant or discountable effects on lynx critical habitat.

PCE 1d - Matrix Habitat

In matrix habitat, activities that change vegetation structure or condition are not considered an adverse effect to lynx critical habitat unless those activities would create a barrier or impede lynx movement

between patches of foraging habitat and between foraging and denning habitat within a potential home range, or if they would adversely affect adjacent foraging habitat or denning habitat. Projects that do not have these features would not result in adverse effects on Canada lynx critical habitat.

Cumulative Effects Analysis

Critical habitat may encompass federal, state, and private lands assessed for cumulative effects under ESA and the National Environmental Policy Act. Implementation of the projects that meet the screening criteria for a “*not likely to adversely affect*” determination should result in low to no cumulative effects to designated critical habitat for lynx from reasonably foreseeable future actions on State and private lands located within the federal Action Area. Although there may be minor effects due to implementation of the projects described herein and impacts from activities on non-federal lands may occur, the conservation objectives for lynx critical habitat as identified in 74 FR 2009 and in the LCAS (Interagency Lynx Biology Team 2013) should be met.

Determination of Effects

Project effects will be documented relative to the screens in Appendix D and those that would result in a “*not likely to adversely affect*” determination would receive programmatic concurrence from the Service.

IV. LITERATURE CITED

Agee, J. K. 2000. Distribution ecology of North American boreal forest and associated northern mixed subalpine forests. Pages 39–82 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires, editors. Ecology and conservation of lynx in the United States. University of Colorado Press, Boulder, USA.

Allard-Duchêne, A., D. Pothier, A. Dupuch, and D. Fortin. 2014. Temporal changes in habitat use by snowshoe hares and red squirrels during post-fire and post-logging forest succession. *Forest Ecology and Management* 313:17–25.

Anderson, C.R., Jr., M.A. Ternent, and D.S. Moody. 2002. Grizzly bear-cattle interactions on two grazing allotments in northwest Wyoming. *Ursus* 13:247-256.

Apps, C. D. 2000. Space-use, diet, demographics, and topographic associations of lynx in the southern Canadian Rocky Mountains: a study. Pages 351–371 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires, editors. Ecology and conservation of lynx in the United States. University Press of Colorado. Boulder, Colorado, USA.

Apps, C.D., B.N. McLellan, J.G. Woods, and M.F. Proctor. 2004. Estimating grizzly bear distribution and abundance relative to habitat and human influence. *Journal of Wildlife Management* 68:138-152.

Aubry, K.B., G. Koehler, and J.R. Squires. 2000. Ecology of Canada lynx in southern boreal forests. Pages 373-396 In Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. (Tech. Eds.). Ecology and conservation of lynx in the United States. University Press of Colorado. Boulder, CO. 480 pp.

Aune, K. and T. Stivers. 1983. Rocky Mountain Front grizzly bear monitoring and investigation. Montana Department Fish, Wildlife and Parks. Helena, MT. 180 pp.

Aune, K., and W. Kasworm. 1989. Final report East Front grizzly studies. Montana Department of Fish, Wildlife, and Parks.

Berg, D. B., Gese, E. M. Squires, J. R., and L. M. Aubry. 2012. Influence of forest structure on the abundance of snowshoe hares in western Wyoming. *J. Wildlife Management* 76:1480-1488.

Blanchard, B. M. 1983. Grizzly bear-habitat relationships in the Yellowstone area. *International Conference of Bear Research and Management*. 5:118-123.

Boulanger, J., and G.P. Stenhouse. 2014. The impact of roads on the demography of grizzly bears in Alberta. *PLoS One* 9(12):e115535. 22 pp.

Bull, E.L.; T.W. Heater; A.A. Clark; J.F. Shepherd; and A.K. Blumton. 2005. Influence of precommercial thinning on snowshoe hares. Res. Pap. PNW-RP-562. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 16 pp.

Bunnell, K. D., J. T. Flinders, and M .L. Wolfe. 2006. Potential impacts of coyotes and snowmobiles on lynx conservation in the Intermountain West, *Wildlife Society Bulletin* 34:828–838.

- Buskirk, S.W., L.F. Ruggiero, K.B. Aubry, D.E. Pearson, J.R. Squires, and K.S. McKelvey. 2000. Comparative ecology of lynx in North American. Pages 397-417 In Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. (Tech. Eds.). Ecology and conservation of lynx in the United States. University Press of Colorado. Boulder, CO. 480 pp.
- Ciarniello, L.M., D. C. Heard, and D. R. Seip. 2015. Grizzly bears use large cutblocks in Central British Columbia: Implications for natural disturbance-based forest harvesting and salvage logging. *Canadian Wildlife Biology & Management* 4:40-54.
- Cohen, J. 2000. Preventing Disaster-Home ignitability in the Wildland Urban Interface. *Journal of Forestry*, Volume 98:3.
- Costello, C.M., and L.L. Roberts. 2020. Northern Continental Divide Ecosystem grizzly bear monitoring team annual report, 2019. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, MT 59901. Unpublished data.
- Craighead, F.C., Jr., and J.J. Craighead. 1972. Grizzly prehibernation and denning activites as determined by radiotracking. *Wildlife Monographs* 32.
- Donelon, S. 2004. Influence of human use on fine scale temporal, spatial use of grizzly bears in the Bow Valley, Alberta. M.S. Thesis. Royal Roads University. Victoria, B.C. 91 pp.
- Felicetti, L.A., Schwartz, C.C., Rye, R.O., Haroldson, M.A., Gunther, K.A., Phillips, D.L., and Robbins, C.T. 2003. Use of sulfur and nitrogen stable isotopes to determine the importance of whitebark pine nuts to Yellowstone grizzly bears. *Canadian J. Zoology* 81: 763–770.
- Felicetti, L.A., Schwartz, C.C., Rye, R.O., Gunther, K.A., Crock, J.G., Haroldson, M.A., Waits, L., and Robbins, C.T. 2004. Use of naturally occurring mercury to determine the importance of cutthroat trout to Yellowstone grizzly bears. *Canadian J. Zoology* 82:493–501.
- French, S.P., M.G. French, and R. R. Knight. 1994. Grizzly bear use of army cutworm moths in the Yellowstone ecosystem. *Bears: their biology and management* 9:389-399.
- Griffin, P.C. and L.S. Mills. 2009. Sinks without borders: snowshoe hare dynamics in a complex landscape. *Oikos* 118: 1487-1498.
- Gunther, K. 1984. The effects of backcountry recreational use on bear use in the Pelican Valley area of Yellowstone National Park. USDI National Park Service, Yellowstone National Park, WY. 20 pp.
- Gunther, K. A., M. A. Haroldson, K. Frey, S. L. Cain, J. Copeland, and C. C. Schwartz. 2004. Grizzly bear-human conflicts in the Greater Yellowstone ecosystem, 1992-2000. *Ursus* 15:10-22.
- Gunther, K.A., and R.A. Renkin. 1990. Grizzly bear predation on elk calves and other fauna of Yellowstone National Park. *Bears: Their Biology and Management* 8:329-334.
- Gunther, K.A., R.R. Shoemaker, K.L. Frey, M.A. Haroldson, S. L. Cain, F.T. van Manen, and J.K. Fortin. 2014. Dietary breadth of grizzly bears in the Greater Yellowstone Ecosystem. *Ursus* 25:61-73.

Haroldson, M. A., M. A. Ternent, K. A. Gunther, and C. C. Schwartz. 2002. Grizzly bear denning chronology and movements in the Greater Yellowstone Ecosystem. *Ursus* 13:29-37.

Haroldson, M. and D. Mattson. 1985. Response of grizzly bears to backcountry human use in Yellowstone National Park. USDI Interagency Grizzly Bear Study Team, Bozeman, MT. 37 pp.

Helms, J.A., editor. 1998. The dictionary of forestry. Society of American Foresters. 210 pp.

Hodges, K.E. 2000. Ecology of snowshoe hares in southern boreal and montane forests. Pages 163-206 in Ruggiero et al., Ecology and Conservation of Lynx in the United States. University Press of Colorado, Boulder, Colorado.

Hodges, K. E., and L. S. Mills. 2005. Snowshoe hares in Yellowstone. *Yellowstone Science*. Vol. 13 (2): 3-15.

Hodges, K. E., Mills, S. L. and K. M. Murphy. 2009. Distribution and abundance of snowshoe hares in Yellowstone National Park. *Journal of Mammalogy*. 90: 870-878.

Hodson, J, D. Fortin, and L. Belanger. 2010. Fine-scale disturbance shape space-use of a boreal forest herbivore. *Journal of Mammalogy* 91: 607-619.

Holbrook, J.D., Squires, J.R., Olson, L.E., Lawrence, R.L., and S.L. Savage. 2017. Multiscale habitat relationships of snowshoe hares (*Lepus americanus*) in the mixed-conifer landscape of the Northern Rockies, USA: Cross-scale effects of horizontal cover with implications for forest management. *Ecology and Evolution* 7: 125-144.

Holbrook, J.D., Squires, J.R., Olson, L.E., DeCesare, N.J., and R.L. Lawrence. 2017b. Understanding and predicting habitat for wildlife conservation: the case of Canada lynx at the range periphery. *Ecosphere* doi.org/10.1002/ecs2.1939.

Holbrook, J.D., Squires, J.R., Bollenbacher, B., Graham, R., Olson, L.E., Hanvey, G., Jackson, S., and R.L. Lawrence. 2018. Spatio-temporal responses of Canada lynx (*Lynx canadensis*) to silvicultural treatments in the Northern Rockies, U.S. *Forest Ecology and Management* 422: 114-124.

Holbrook, J.D., Squires, J.R., Bollenbacher, B., Graham, R., Olson, L.E., Hanvey, G., Jackson, S., Lawrence, R.L., and S.L. Savage. 2019. Management of forests and forest carnivores: Relating landscape mosaics to habitat quality of Canada lynx at their range periphery. *Forest Ecology and Management* doi.org/10.1016/j.foreco.2019.01.011.

Holland, T.M. 1986. Grizzly bear habitat improvement projects on the South and Middle Fork Flathead River. Pages 190-194 in G.P. Contreras and K.E. Evans, Eds. Proceedings Grizzly bear habitat symposium. USDA Forest Service Intermountain Research Station, Ogden, UT. General Technical Report Int-207

Interagency Grizzly Bear Study Team (IBST). 2013. Response of Yellowstone grizzly bears to changes in food resources: a synthesis. U.S. Geological Survey, Northern Rocky Mountain Science Center, Bozeman, Montana.

_____. 2015. Grizzly bear annual habitat monitoring report, in *Yellowstone grizzly bear investigations*. F. T. van Manen, M. A. Haroldson, and B. E. Karabensh, editors. U.S. Geological Survey, Bozeman, MT.

_____. 2020. Known and probably grizzly bear mortalities in the Greater Yellowstone Ecosystem. https://www.usgs.gov/science/interagency-grizzly-bear-study-team?qt-science_center_objects=4#qt-science_center_objects

Interagency Grizzly Bear Committee (IGBC). 1986. Interagency grizzly bear guidelines. U.S. Forest Service, Wyoming Fish and Game, Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, Idaho Department of Fish and Game, Montana Fish Wildlife and Parks, and Washington Game Department.

_____. 1994. Interagency Grizzly Bear Committee Task Force Report, Grizzly Bear/Motorized Access Management. 8 pp.

_____. 1998. Interagency Grizzly Bear Committee Taskforce Report: Grizzly bear/motorized Access Management. Missoula, MT, USA.

_____. 2001. Response to peer review of the A19 and Proposed Approach to managing access in grizzly bear habitat. Northern Continental Divide Ecosystem Technical Group. Dated 24 January 2001. xx pp.

IGBC Road Access Task Force. 1998. Rationale and choices made in the review and development of an access proposal for the NCDE grizzly bear ecosystem, IGBC, Bozeman, Montana, USA

Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Ivan, J.S. and T.M. Shenk. 2016. Winter diet and hunting success of Canada lynx in Colorado. *Journal of Wildlife Management* 80: 1049-1058.

Johnson, W (editor). 2008. "Bear Year" definition for the Cabinet-Yaak ecosystem. U.S. Forest Service. Unpublished report. Kootenai National Forest. Libby, MT. 2 pp.

Jonkel, C. 1980. Grizzly bears and livestock. *Western Wildlands* 6:11-14.

Jonkel, J. 2019. 2014-2019 Region 2 Grizzly research and management. Montana Fish, Wildlife and Parks. Internal report. 12 pp.

Joep, K. L. 1985. Implications of grizzly bear habituation to hikers. *Wildlife Society Bulletin* 13:32-37.

Kasworm, W. F., and T. L. Manley. 1990. Road and trail influences on grizzly bears and black bears in northwest Montana. *International Conference on Bear Research and Management* 8:79-84.

Kasworm, W. F., T. G. Radandt, J. E. Teisberg, T. Vent, A. Welander, M. Proctor, H. Cooley and J. Fortin-Noreus. 2019a. Cabinet-Yaak grizzly bear recovery area 2018 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana. 98 pp.

Kasworm, W. F., T. G. Radandt, J. E. Teisberg, A. Welander, T. Vent, M. Proctor, H. Cooley, and J. Fortin-Noreus. 2019b. Selkirk Mountains grizzly bear recovery area 2018 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana. 53 pp.

Kearney, S.P., N.C. Coops, G.B. Stenhouse, S.E. Nielsen, T. Hermosilla, J.C. White, and M.A. Wulder. 2019. Grizzly bear selection of recently harvested forests is dependent on forest recovery rate and landscape composition. *Forest Ecology and Management*. 449:117459.

Kelsall, J.P., E.S. Telfer, and T.D. Wright. 1977. The effects of fire on the ecology of the boreal forest, with particular reference to the Canadian north: a review and selected bibliography. Can. Wildlife Service, Occasional Paper No. 32. Ottawa, Canada.

Kendall, K. C. 1986. Grizzly and black bear feeding ecology in Glacier National Park, Montana. Progress Report 1982-1985. USDI National Park Service, Glacier National Park, Montana, USA.

Kerns, B. K., S. J. Alexander, and J. D. Bailey. 2004. Huckleberry abundance, stand conditions, and use in Western Oregon: Evaluating the role of forest management. *Economic Botany* 58:668-678.

Knight, R.R., B.M. Blanchard, and L.L. Eberhardt. 1988. Mortality patterns and populations sinks for Yellowstone grizzly bears, 1973-1985. *Wildlife Society Bulletin* 16:121-125.

Knight, R.R. and S.L. Judd. 1983. Grizzly bears that kill livestock. *Int. Conf. Bear Res. And Manage.* 5:186-190.

Knight, R.R., B.M. Blanchard, and D.J. Mattson. 1985. Yellowstone Grizzly Bear Investigations. Annual Report of the Interagency Study Team, 1983 and 1984. USDI Interagency Grizzly Bear Study Team, Bozeman, MT. 41 pp.

Koehler, G.M. 1990. Population and habitat characteristics of lynx and snowshoe hares in north central Washington. *Canadian Journal of Zoology* 68:845-851.

Koehler, G.M, M.G. Hornocker, and H.S. Hash. 1979. Lynx movements and habitat use in Montana. *Canadian Field-Naturalist* 93(4):441-442.

Kolbe, J. A., J. R. Squires, D. H. Pletscher, and L. F. Ruggiero. 2007. The effect of snowmobile trails on coyote movements within lynx home ranges. *Journal of Wildlife Management* 71:1409–1418.

Kosterman, M., J.S. Squires, J.D. Holbrook, D. Pletscher, and M. Hebblewhite. 2018. Forest structure provides the income for reproductive success in a southern population of Canada lynx. *Ecological Applications* 28:1032-1043.

Kumar, A.V., Sparks, J.R. and L.S. Mills. 2018. Short-term response of snowshoe hares to western larch restoration and seasonal needle drop. *Restoration Ecology* 26: 156-164.

Lee, P.L. and J. Weaver. 1981. Biological evaluation man/grizzly conflicts related to sheep grazing in essential grizzly bear habitat on the Targhee National Forest. USDA Forest Serv., Targhee National Forest, St. Anthony, ID. 29 pp.

LeFranc, M. N., Jr., M. B. Moss, K. A. Patnode, and W. C. Sugg III, editors. 1987. Grizzly bear compendium. The National Wildlife Federation, Washington, D.C., USA.

Lewis, C.W. and K. E. Hodges, G. M. Koehler, and L. S. Mills. 2011. Influence of stand and landscape features on snowshoe hare abundance in fragmented forests. *Journal of Mammalogy* 92:561-567.

- Lewis, L., and C.R. Wenger. 1998. Idaho's Canada lynx: pieces of the puzzle. Idaho Bureau of Land Management, Technical Bulletin No. 98-11. 21 pp.
- Mace, R.D. and C. Jonkel. 1980. The effects of logging activity on grizzly bear movements. Border Grizzly Project, Univ. Montana, Missoula. Spec. Rep. No. 38, 11 pp.
- Mace, R. D and C. J. Jonkel. 1986. Local food habits of the grizzly bear in Montana. International Conference on Bear Research and Management 6:105-110.
- Mace, R.D. and T.L. Manley. 1993. South Fork Flathead River Grizzly Bear Project: Progress Report for 1992. 34pp.
- Mace, R.D. and J.S. Waller. 1996. Grizzly bear distribution and human conflicts in Jewel Basin Hiking Area, Swan Mountains, Montana. Wildlife Society Bulletin 24:461-467.
- Mace, R. D., J. S. Waller, T. L. Manley, L.J. Lyon, and H. Zuuring. 1996. Relationships among grizzly bears, roads, and habitat in the Swan Mountains, Montana. Journal of Applied Ecology 33:1395-1404.
- Mace, R. and J. Waller 1997. Final Report: Grizzly bear ecology in the Swan Mountains. Montana Fish, Wildlife and Parks, Helena. 191 pp.
- Mace, R. D., J. S. Waller, T. L. Manley, K. Ake, and W. T. Wittinger. 1999. Landscape evaluation of grizzly bear habitat in western Montana. Conservation Biology 13:367-377.
- Mace, R.D., and L. Roberts. 2011. Northern continental divide ecosystem grizzly bear monitoring team annual report, 2009-2010. Montana Fish Wildlife and Parks, Kalispell, MT.
- Mace, R. D., D. W. Carney, T. Chilton-Radandt, S. A. Courville, M. A. Haroldson, R. B. Harris, J. Jonkel, B. McLellan, M. Madel, T. L. Manley, C. C. Schwartz, C. Servheen, G. Stenhouse, J. S. Waller, E. Wenum. 2012. Grizzly bear population vital rates and trend in the Northern Continental Divide Ecosystem, Montana. J. Wildlife Management 76:119-128.
- MacHutchon, G., and M. Proctor. 2015. The effect of roads and human action on roads on grizzly bears and their habitat. 2015. *Trans-border Grizzly Bear Project* report. 12 p.
- Manley, T., and J. Vallieres. 2019. Grizzly bear management 2019 annual report: NCDE portion of Region 1. Montana Fish, Wildlife and Parks. Internal report. 28 pp.
- Martin, S. 1983. Factors influencing globe huckleberry fruit production in northwestern Montana. International Conference Bear Research and Management 5:159-165.
- Martinka, C. J. and K. C. Kendall. 1986. Grizzly bear habitat research in Glacier National Park, Montana. Pages 19-23 in Proceedings of the Grizzly Bear Habitat Symposium, USDA Forest Service General Technical Report INT-207.
- Mattson, D.J., R.R. Knight, and B.M Blanchard. 1987. The effects of developments and primary roads on grizzly bear habitat use in Yellowstone National Park, Wyoming. International Conference Bear Research and Management 7:259-273.

- McKelvey, K.S., K.B. Aubry, and Y.K. Ortega. 2000. History and distribution of lynx in the contiguous United States. Pages 207-264 In Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. (Tech. Eds.). Ecology and conservation of lynx in the United States. University Press of Colorado. Boulder, CO. 480 pp.
- McLellan, B.N. and R.D. Mace. 1985. Behavior of grizzly bears in response to roads, seismic activity, and people. Preliminary Report, Can. Border Grizzly Project, Cranbrook, B.C. 53 pp.
- McLellan, B. N., and D. M. Shackleton. 1988. Grizzly bears and resource extraction industries: effects of roads on behavior, habitat use and demography. *Journal of Applied Ecology* 25:451-460.
- McLellan, B.N. and D.M. Shackleton. 1989. Immediate reactions of grizzly bears to human activities. *Wildlife Society Bulletin* 17:269-274.
- McLellan, B.N., F.W. Hovey, R.D. Mace, J.D. Woods, D.W. Carney, M.L. Gibeau, W.L. Wakkinen, W.F. Kasworm, 1999. Rates and causes of grizzly bear mortality in the interior mountains of British Columbia, Alberta, Montana, Washington, and Idaho. *Journal of Wildlife Management* 63, 911–920.
- Montana/Northern Idaho Level 1 Terrestrial Biologists Team. 2009. Guide to effects analysis of helicopter use in grizzly bear habitat. 18 pp.
- Moss, M. and M.N. LeFranc, Jr. 1987. Roads and highway impacts. Pages 69-71 *In* M.N. LeFranc, Jr., M. Moss, K.A. Patnode, and W.C. Sugg III, (Eds.) Grizzly Bear Compendium. Interagency Grizzly Bear Committee. 540 pp.
- Mowat, G., K.G. Poole, and M. O'Donoghue. 2000. Ecology of lynx in northern Canada and Alaska. Chapter 9 In Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. (Tech. Eds.). Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 pp.
- Murphy, K. M., Potter, T. M., Halfpenny, J. C., Jones, T. M., Lundgerg, P. A., and N. D. Berg. Distribution of Canada lynx in Yellowstone National Park. 2006. *Northwest Science*, Vol. 80, No. 3: 199-206.
- Northern Continental Divide Ecosystem Subcommittee. 2020. Conservation strategy for the grizzly bear in the Northern Continental Divide Ecosystem. 170 pp + appendices.
- Oliver, C.D. and B.C. Larson. 1996. Forest Stand Dynamics. Pages 145- 170, 213-234. 520 pp.
- Olson, L.E., J.R. Squires, E.K. Roberts, J.S. Ivan, and M. Hebblewhite. 2018. Sharing the same slope: Behavioral responses of a threatened mesocarnivore to motorized and nonmotorized winter recreation. *Ecology and Evolution* (8): 8555-8572.
- Orme, M.L., and R.G. Williams. 1986. Coordinating livestock and timber management with the grizzly bear in situation 1 habitat, Targhee National Forest. Pages 195-203 in G.P. Contreras and K.E. Evans, compilers. Proceedings—grizzly bear habitat symposium. U.S. Forest Service General Technical Report INT-207.

Quigley, T.M., R. Haynes, R.W. Graham, and T. Russell, Technical Editors. 1996. Integrated scientific assessment for ecosystem management in the interior Columbia basin and portions of the Klamath and Great Basins. USDA Forest Service, Pacific Northwest Research Station. Gen. Tech. Rep. PNW-GTR-382. Portland, OR. 303 pp.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. 2000. The scientific basis for lynx conservation: qualified insights. Pages 443-454 In Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. (Tech. Eds.). Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 pp.

Sarmiento, W. and S. Zielke. 2019. 2019 Region 4 Prairie Area grizzly bear management efforts. Montana Fish, Wildlife and Parks. Internal Report. 5 pp.

Schallenberger, A., and C.J. Jonkel. 1980. Rocky Mountain east front grizzly studies, 1979. Annual report. Border Grizzly Project Special Report No. 39. Border Grizzly Project, Missoula, Montana, USA.

Schleyer, B.O., J.J. Jonkel, K.G. Rhoades, and D.M. Dunbar. 1984. The effects of nonmotorized recreation on grizzly bear behavior and habitat use. USDI Interagency Grizzly Bear Study Team, Bozeman, MT. 83 pp.

Schwartz, C.C., M.A. Haroldson, K.A. Gunther, and D. Moody. 2002. Distribution of grizzly bears in the Greater Yellowstone Ecosystem, 1990-2000. *Ursus* 13:203-212.

Schwartz, C.C., S.D. Miller, and M.A. Haroldson. 2003. Grizzly bear. Pages 556-586 in G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, editors. *Wild Mammals of North America: Biology, Management, and Conservation*. Second edition. The Johns Hopkins University Press, Baltimore, Maryland.

Schwartz, C.C., M.A. Haroldson, and G.C. White. 2010. "Hazards Affecting Grizzly Bear Survival in the Greater Yellowstone Ecosystem." *Journal of Wildlife Management*. 74: 654-667.

Schwartz C.C., Gude P.H., Landenburger L., Haroldson M.A., Podruzny S. 2012. Impacts of rural development on Yellowstone wildlife: linking grizzly bear *Ursus arctos* demographics with projected residential growth. *Wildlife Biology* 18(3):246-263.

Servheen, C., T.T. Thier, C.J. Jonkel, and D. Beaty. 1981. An ear-mounted transmitter for bears. *Wildlife Society Bulletin* 9(1): 56-57.

Servheen, C. 1981. Grizzly bear ecology and management in the Mission Mountains, Montana. Ph. D. dissertation. University of Montana, Missoula, Montana, USA.

Servheen, C. 1983. Grizzly Bear Food Habits, Movements, and Habitat Selection in the Mission Mountains, Montana. *Journal of Wildlife Management*, Vol. 47, No. 4 (Oct. 1983), pp. 1026-1035.

- Simonin, K.A. 2000. *Vaccinium membranaceum*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer).
- Squires, J. R., N. J. DeCesare, J. A. Kolbe, and R. F. Ruggiero. 2008. Hierarchical den selection of Canada lynx in western Montana. *Journal of Wildlife Management* 72:1497–1506.
- Squires, J.R., Decesare, N.J., Kolbe, J.A., and L.F. Ruggiero. 2010. Seasonal resource selection of Canada lynx in managed forests of the northern Rocky Mountains. *Journal of Wildlife Management* 74(8):1648–1660; 2010; DOI: 10.2193/2009-184.
- Squires, J. R., DeCesare, N. J., Tomson, S., Ruggiero, L. F, and B. Oakleaf. 2003. Distribution of lynx and other forest carnivores in the Wyoming Range, southcentral Wyoming. Final Report. RMRS and Wyoming Game and Fish Department.
- Squires, J.R., DeCesare, N.J., Olson, L.E., Kolbe, J.A., Hebblewhite, M and Parks, S.A. 2013. Combining resource selection and movement behavior to predict corridors for Canada lynx at their southern range periphery. *Biological Conservation* 157:187-195.
- Squires, J. R., and L. F. Ruggiero. 2007. Winter prey selection of Canada lynx in northwestern Montana. *Journal of Wildlife Management* 71:310– 315.
- Squires, J. R., L. F. Ruggiero, J. A. Kolbe, and N. J. DeCesare. Lynx Ecology in the Intermountain West. Research Program Summary Summer 2006. USDA Forest Service, Rocky Mountain Research Station, Missoula, Montana. 51 pp.
- Staples, W.R. 1995. Lynx and coyote diet and habitat relationships during a low hare population on the Kenai Peninsula, Alaska. M.S. Thesis, University of Alaska, Fairbanks, Alaska, USA
- Thier, T. and D. Sizemore. 1981. An evaluation of grizzly locations in the Border Grizzly Project area, 1975-1980. Border Grizzly Project University of Montana, Missoula. Special Report No. 47. 16 pp.
- Thorton, D.H., A.J. Wirsing, J.D. Roth, and D.L. Murray. 2012. Complex effects of site preparation and harvest on snowshoe hare abundance across a patchy forest landscape. *Forest Ecology and Management* 280: 132-139.
- Tirmenstein, D. 1990. Underburning effects on big huckleberry in a Douglas-fir/big huckleberry community on the Lubrecht Experimental Forest, Montana. In: *Vaccinium membranaceum*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer).
- Trainor, A.M., O.J. Schmitz, J.S. Ivan, and T.M. Shenk. 2014. Enhancing species distribution modeling by characterizing predator-prey interactions. *Ecological Applications* 24: 204-216.
- USDI Fish and Wildlife Service. 1993. Grizzly Bear Recovery Plan. Denver, CO. 75 pp.
- _____. 2005. Recovery Plan Outline: Contiguous United States distinct population segment of the Canada lynx. Montana Field Office, Helena, Montana. 21 pp. <https://www.fws.gov/mountain-prairie/es/species/mammals/lynx/final%20lynx%20RecoveryOutline9-05.pdf>.

_____. 2007. Biological opinion on the effects of the northern Rocky Mountains lynx amendment of the distinct population segment of Canada lynx (*Lynx canadensis*) in the contiguous United States. Helena, Montana. 125 pp.

_____. 2009. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx; Final Rule. Federal Register / Vol. 74, No. 36 / Wednesday, February 25, 2009 / Rules and Regulations. Pp. 8615-8702.

_____. 2007. Final conservation strategy for the grizzly bear in the Greater Yellowstone Area. Interagency Conservation Strategy Team, Missoula, Montana, USA.

_____. 2009. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx; Final Rule. Federal Register / Vol. 79, No. 177 / Friday September 12, 2014 / Rules and Regulations. Pp. 54782-54846.

_____. 2011. Grizzly Bear (*Ursus arctos horribilis*) 5-year status review: summary and evaluation. Grizzly Bear Recovery Office, Missoula, MT. 205 pp.

_____. 2019. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Reinstatement of ESA Listing for the Grizzly Bear in the Greater Yellowstone Ecosystem in Compliance with Court Order. Final Rule. Federal Register / Vol. 84, No. 147 / Wednesday July 31, 2019 / Rules and Regulations. Pp. 37144-37145.

USDA Forest Service. 1982. Endangered, threatened, and sensitive plant and animal species and their habitats on the Targhee National Forest. USDA Forest Service, Targhee National Forest, St. Anthony, ID, 100 pp.

_____. 1990. CEM -A model for assessing effects on grizzly bears. USDA Forest Service, Missoula, Mont. 24 pp.

_____. 2007. Northern Rockies lynx management direction record of decision. USDA Forest Service, Northern Region 1, Missoula, Montana. 71 pp.

U.S. Forest Service and U.S. Fish and Wildlife Service. 2008. Access Amendment Level 1 meeting notes. Dated June 10, 2008.

Vanbianchi, C.M. 2015. Habitat use and connectivity for Canada lynx in the North Cascade Mountains, Washington. M.S. Thesis, University of British Columbia, Vancouver, British Columbia. 271 pp.

Vanbianchi, C.M., M.A. Murphy, and K.E. Hodges. 2017. Canada lynx use of burned areas: Conservation implications of changing fire regimes. Ecology and Evolution 7: 2382-2394.

Vanbianchi, C.M., W.L. Gaines, M.A. Murphy, J. Pither, and K.E. Hodges. 2017b. Habitat selection by Canada lynx: making do in heavily fragmented landscapes. Biodiversity Conservation 26: 3343-3361.

Vanbianchi, C.M., Gaines, W.L., Murphy, M.A., and K.E. Hodges. 2018. Navigating fragmented landscapes: Canada lynx brave poor quality habitats while traveling. *Ecology and Evolution* 8: 11293-11308.

Volson, D.P. 1994. Habitat use of a grizzly bear (*Ursus arctos*) population in the Selkirk Mountains of northern Idaho and southern British Columbia. M.S. Thesis, University of Idaho, Moscow, ID. 121 pp.

Waller, J.S. 1992. Grizzly bear use of habitats modified by timber management. Montana State University, Bozeman, MT. 64 pp.

Waller, J. S. and R. D. Mace. 1997. Grizzly bear habitat selection in the Swan Mountains, Montana. *Journal of Wildlife Management* 61:1032-1039.

Wells, S.L., L.B. McNew, D.T. Tyers, F.T. van Manen, D.J. Thompson. Grizzly bear dep depredation on grizzly bear allotments in the Yellowstone ecosystem. *J. of Wildlife Management* 83:556-566.

Wielgus R.B., P. Vernier, T. Schivatcheva. 2002. Grizzly bear use of open, closed, and restricted forestry roads. *Canadian J. Forest Research* 32(9):1597-1606.

Wilson, S.M., M.J. Madel, D. J. Mattson, J.M. Graham, J.A. Burchfield, and J.M. Belsky. 2005. Natural landscape features, human-related attractants, and conflict hotspots: a spatial analysis of human-grizzly bear conflicts. *Ursus* 16:117-129.

White, D. Jr., K.C. Kendall, and H.D. Picton. 1998. Grizzly bear feeding activity at alpine army cutworm moth aggregation sites in northwest Montana. *Can. J. Zool.* 76:835-842.

White, D. Jr., K.C. Kendall, and H.D. Picton. 1999. Potential energetic effects of mountain climbers on foraging grizzly bears. *Wildlife Society Bulletin* 27:146-151.

White, D., K.C. Kendall, and H.D. Picton. 1998. Grizzly bear feeding activity at alpine army cutworm moth aggregation sites in northwestern Montana. *Canadian J. of Zoology* 76:221-227.

Zager, P., C. Jonkel, and J. Habeck. 1983. Logging and wildfire influence on grizzly bear habitat in Northwestern Montana. *Int. Conf. Bear Res. and Manage.* 5:126-134.

APPENDIX A: Grizzly Bear Screens

GRIZZLY BEAR PROJECT SCREENING ELEMENTS AND DETERMINATIONS

Three considerations are prerequisite to more detailed consideration of other project information and are considered in Part 1 of the screening process: (1) the area must not have existing wheeled motorized access conditions that are resulting in potentially significant effects to grizzly bears (as defined by ESA), (2) human foods, livestock feed, garbage, and other attractants must be managed by the application of an adequate “food storage” requirement similar to the NCDE or GYE food storage orders, and if no specific rule exists for the area, application of site-specific attractant storage provisions will be considered adequate; and (3) projects that involve seeding or planting of grasses, forbs, or shrubs, must do so in a manner that will tend not to attract bears into areas where increased mortality risk or interaction between bears and people is likely, such as adjacent to roads (open or restricted) or developed or designated recreation and/or camping sites. **Note:** The geographic scope of this programmatic biological assessment applies to areas where grizzly bears may be present as defined by the USFWS – not just within grizzly bear Recovery Zone boundaries and not just where grizzly bears are known to reside or reproduce.

After access management, food/attractant storage, and seeding/planting of grasses, forbs, or shrubs has been considered in Part 1, only then can other project details be considered in the Screening Criteria Table, Part 2. Table 2 represents a comprehensive activity list. Factors relative to disturbance/displacement of grizzly bears and human/grizzly conflict were previously analyzed in this analysis and are not addressed further in Table 2. The “*not likely to adversely affect*” (NLAA) determination reflects a conservative determination. There may be activities listed as NLAA in Table 2 that upon site-specific analyses warrant a “*no effect*” (NE) determination, which can be selected at the discretion of the Biologist, in which case only in-house documentation is needed.

Useful Terminology and Background Information for Using the Grizzly Bear Screens:

Access Management Direction: Any grizzly bear access management standards and guidelines required to be implemented on National Forest lands through Forest Plans and/or Biological Opinions pertaining to Grizzly Bear Recovery Zones (Recovery Zones); OR areas outside of Recovery Zones identified as receiving recurring use by grizzly bears; OR other areas where grizzly bears may be present. Projects must be in compliance with the appropriate direction in order to be screened.

Administrative Use Levels: Refers to the assigned use levels (i.e. # of trips) for individual recovery zones or Primary Conservation Area (PCA) OR, if they occur, the individual restrictions imposed on gated roads located outside the recovery zones/PCA per Forest Plan direction (e.g. no public access in keeping with no net increase in open linear miles of route associated with the SCYE Bears Outside Recovery Zones (BORZ), or NCDE Zone 1 or DCA). This parameter is applied on an individual road basis, with those roads that exceed the use limits being treated as “open” for purposes of calculating OMRD within Recovery Areas. In some areas located outside Recovery Zones, only FS employees or their contractors are allowed to conduct motorized access activities on identified, restricted roads. **Please refer to the Administrative Use levels / standards associated with the recovery zone and/or specific Forest Land Management Plan for details.**

Core: Core habitat is defined as areas within recovery zones or PCA which contain no motorized travel routes during the active bear year and are more than 0.31 miles (500 meters) from a drivable route. These areas are an important component for adult female grizzly bears that have successfully reared and weaned offspring. In some forests (Idaho Panhandle, Kootenai, and portions of Lolo National Forests) core habitat also excludes

0.31 miles around high use non-motorized trails per IGBC 1998 and as stated in their respective Forest Plans. (On the Custer-Gallatin National Forest, core habitat is referred to as 'secure habitat', while other forests use the term 'secure core' within the PCA). Also see "Secure Habitat" below.

Daytime: During the period from 1/2 hour before sunrise to 1/2 hour after sunset.

Footprint: The current spatial extent of an activity or site, not the spatial extent as it is drawn on a site plan nor the full extent of a permit area.

Mechanical Equipment: includes off-road heavy **motorized** equipment such as for site preparation, fuel piling or mastication, log yarding. Does not include handheld motorized tools such as chainsaws and sprayers.

Road: A National Forest System motor vehicle route more than 50 inches wide unless identified and managed as a trail.

Open Road: A road without restrictions on motorized vehicle use (IGBC 1998).

Restricted Road: A road on which wheeled motorized vehicle use is legally restricted seasonally or yearlong. The road requires a physical obstruction (e.g. gate, berm, removable barricade) (IGBC 1998).

Seasonal Habitats for Grizzly Bears: See pages 6 and 7 above for discussion of "High-quality Spring", "High-quality Fall", and Denning habitats and their typical dates of use by grizzly bear ecosystem.

Secure Habitat: Secure habitat is defined as areas outside recovery zones or PCA which contain no motorized travel routes during the active bear year and are more than 0.31 miles (500 meters) from a drivable route.

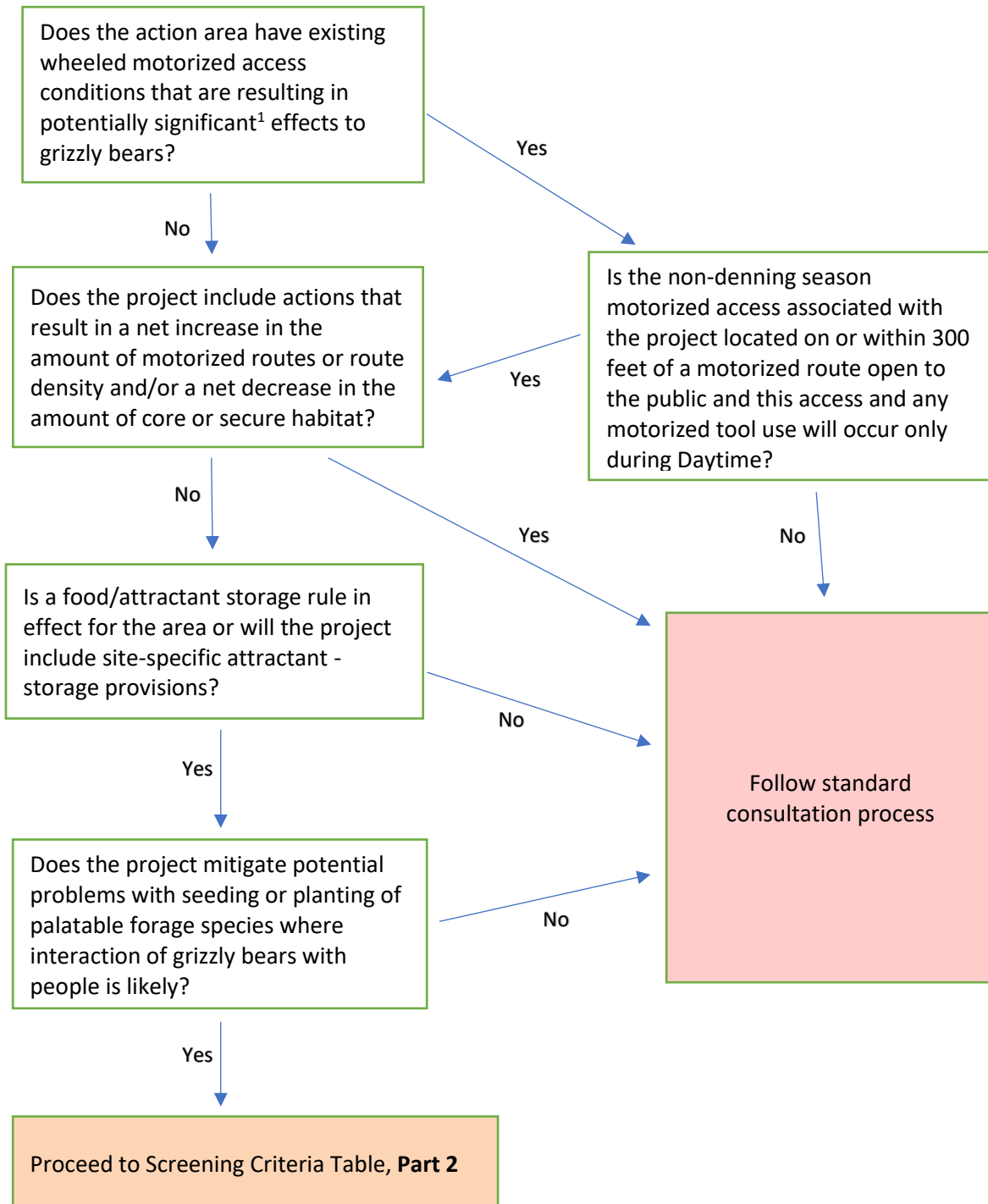
Travel Management and Limits on Off-Road Travel:

Code of Federal Regulations: 36 CFR212.51—Designation of roads, trails, and areas. There are no allowances for vehicle off-route travel to retrieve firewood. However, under subsection (b) motor vehicle use for dispersed camping or big game retrieval (within a specified distance of certain forest roads or trails) may be allowed by the responsible official.

FSM 7700-Travel Management (Chapter 7710): 7715.74—Motor Vehicle Use for Big Game Retrieval and Dispersed Camping. The Responsible Official may include in a designation for motor vehicle use under Subpart B the limited use of motor vehicles within a specified distance of certain Forest roads and Forest trails where motor vehicle use is allowed, and if appropriate within specified time periods, solely for the purposes of dispersed camping or retrieval of a downed big game animal by an individual who has legally taken that animal (big game retrieval).

The maximum off-route travel distance used in **Region 1 of the Forest Service is 300 feet** (~92 meters). This may be from the centerline of the road prism or from the edge of the prism. Regardless, NOT all roads are designated and some forests have designated less off-route travel for dispersed camping (i.e. 100 feet (30 meters) (e.g. Bitterroot National Forest).

GRIZZLY BEAR SCREENING PROCESS, PART 1



¹Per ESA use of the term 'significant'. While this term is not expressly defined under statute, regulation, or policy, if adverse effects rise to the level of **take** they are not considered insignificant (USFWS and NMFS 1998).

Grizzly Bear Screen, Part 2: The following Screening Criteria Table identifies forest activities and criteria, that when met, will allow the project to meet “screening elements.” Remember to screen all appropriate activity types involved in implementation of the project. If any project activity type does not meet the identified criteria, the standard Section 7 process is required if consultation is to proceed. For capitalized terms, refer to the “Useful Terminology and Background Information for Using the Grizzly Bear Screens” above (pages 37-38).

#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
1	Camping	Camping (crews, contractors, outfitters, or anyone else needing to camp as an element of the project or permit)	<ul style="list-style-type: none"> Camping occurs at developed campgrounds and adheres to all site regulations OR camping at dispersed sites occurs only outside High-quality Spring habitats during the Spring season and only outside High-quality Fall Habitats during the Fall season. If camping at dispersed sites, ≤ 20 individuals for 5 days/campsite. Food/equipment caching would not lead to potential for attraction. 	NLAA
2	Forest Products	Personal-use firewood collection, Christmas tree cutting, berry picking, mushroom picking, and collection of “other forest products” (such as bear grass greens, medicinal herbs, pachistima, etc.)	<ul style="list-style-type: none"> Does not include off-road mechanical skidding or hauling more than 300 feet from existing Open Road. Includes ‘bear country safety’ messaging. Enforces sanitation standards. 	NLAA
		Commercial firewood collection, berry picking, commercial Christmas tree, and “other forest products” such as bear grass greens, medicinal herbs, pachistima, etc.	<ul style="list-style-type: none"> Does not include commercial mushroom picking. Does not include off-road mechanical skidding or hauling more than 300 feet from existing Open Road. Includes ‘bear country safety’ messaging. Enforces sanitation standards. 	NLAA
3	Gravel Pit Use (Existing Pit)	Existing gravel pit for road maintenance or other administrative uses	<ul style="list-style-type: none"> Use occurs on existing Open Roads OR if on Restricted Roads, use does not exceed Administrative Use Levels. Does not include the expansion of the existing Footprint of the pit site. Does not include blasting or rock crushing. 	NLAA

⁵ References for crew levels and duration of use as well as time frames identified under Screening Criteria include: CEM – A model for assessing effects on grizzly bears, 1990; Response to peer review of the A19 and proposed approach to managing access in grizzly bear habitat, NCDE Technical Group 1/24/01; and Draft, Rationale and choices made in the review and development of an access direction proposal for the NCDE grizzly bear ecosystem, 11/24/1998.

#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
4	Habitat Restoration	This includes non-mechanical activities or use of handheld motorized tools associated with fencing, fish barrier development, fish species removal/trapping, rotenone treatment, interpretation/conservation education, meadow restoration, riparian planting and restoration, snag creation, and water source development.	<ul style="list-style-type: none"> Project occurs outside High-quality Spring habitat OR completed in ≤5 day if located within High-quality Spring habitat areas during the Spring season. Project does not result in an increase in public use or user type. Motorized vehicle use occurs on existing Open Roads or, if on Restricted Roads, use does not exceed Administrative Use Levels. 	NLAA
5	Hard Rock Mining	Quarries, recreational mining (includes dredging), small mines, exploratory drilling, and reclamation of small mines.	<ul style="list-style-type: none"> Less than 2 acres would be impacted. Activities occur only within 300 feet of an Open Road. If in High-quality Spring habitat during the Spring season, activities would be limited to ≤2 days/activity/Action Area if in Spring Season. 	NLAA
6	Hazard Tree and Hazardous Fuels Removal	Removal of hazard trees, blowdown, and/or hazardous fuels in and around existing developments	<ul style="list-style-type: none"> Occurs within 300 feet of developed campgrounds or administrative or authorized buildings or structures (including lookouts, communication sites, corrals, rental cabins, and recreation residences⁶). Does not apply to removal along linear features (i.e. Roads or utility lines) UNLESS they are located within 300 feet of buildings or structures as described above. All motorized access must meet criteria in Activity Component "Roads and Road Maintenance". 	NLAA
7	Mechanical Equipment	This is motorized equipment. This includes off-road equipment operation (such as site preparation, fuel piling, log yarding) or motorized use associated with other activities types in this screen	<ul style="list-style-type: none"> Activities occur within 300 feet of existing Open Road. If in High-quality Spring habitat during the Spring season, less than 2 acres would be impacted and ≤2 days/activity/Action Area. 	NLAA
		Airplane or helicopter use	<ul style="list-style-type: none"> Use includes ≤2 activities⁷ per Year per Action Area ≤2 days per activity 	NLAA

⁶ Recreation residences are privately owned structures on small areas of Forest Service lands that are permitted for personal, noncommercial recreational use. In USFS Region 1 these permitted lands average about 0.6 acres in size and are rarely larger than 1.5 acres.

⁷ Activities includes all low-level helicopter use associated with a given project that are slated to occur to implement the project (R1 Level 1 Team 2009).

#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
8	Prescribed Fire	General support, ignition, mop-up using hand tools and crews (also see helicopter use in # 7 above for aerial ignition projects)	<ul style="list-style-type: none"> • If within High-quality Spring habitat during the Spring period or High-quality Fall habitat during the Fall period, project is completed in <2 days. • Motorized vehicle use occurs on existing Open Roads OR if on Restricted Roads, use does not exceed Administrative Use Levels. 	NLAA
		Airplane or helicopter use	<ul style="list-style-type: none"> • Use includes ≤2 activities⁸ per year per Action Area. • ≤2 days per activity 	NLAA
		Fire line construction including felling small trees, use of chainsaws,	<ul style="list-style-type: none"> • Fire line does not/will not function as a road or trail and will be reclaimed after the fire. 	NLAA
		Defensible space treatments (within 100 meters of structure)	<ul style="list-style-type: none"> • Planting and/or seeding does not include palatable forage species. 	NLAA
9	Range Management	Infrastructure development (also see mechanical equipment use as appropriate)	<ul style="list-style-type: none"> • If within High-quality Spring habitat, the use either occurs outside the Spring Period OR is completed in ≤ 5 days. • Project does not result in an increase in public use or user type. • Motorized vehicle use occurs on existing Open Roads or, if on Restricted Roads, use does not exceed Administrative Use Levels. 	NLAA
		Grazing	<ul style="list-style-type: none"> • <i>Maintains or reduces</i> existing livestock grazing or changes livestock class to a less vulnerable species, and no history of depredation or control actions. 	NLAA
10	Recreation Management (see #14 for Special Uses)	Motorized Trail construction or changing a trail from non-motorized to motorized	NA	Potential LAA, Follow Standard Consultation
		Trail maintenance or reconstruction	<ul style="list-style-type: none"> • Does not result in an <i>increase</i> in use or change in user type which results in greater potential for disturbance of more than approximately 20 parties/week. 	NLAA

⁸ Activities includes all low-level helicopter use associated with a given project that are slated to occur to implement the project (R1 Level 1 Team 2009).

#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
		Non-motorized trail relocation, or new non-motorized trail construction of ½ mile or less	<ul style="list-style-type: none"> Does not result in increase in use or change of user type which results in greater potential for disturbance of more than approximately 20 parties/week. New construction or relocation is ½ mile or shorter. Project is outside of High-quality Spring habitat. Project will not result in a loss of Core or Secure Habitat. 	NLAA
		Facility operations, including developed and dispersed camping as well as trailheads. For developed campgrounds, this includes tree removal within 100 feet of the existing facility Footprint	<ul style="list-style-type: none"> Educates public campers and enforces sanitation standards. Does not increase use or change from non-motorized to motorized user type. 	NLAA
11	Roads and Road Maintenance	Permanently opening Restricted Roads or building permanent roads	<ul style="list-style-type: none"> NA 	Potential LAA, Follow Standard Consultation
		Road reclamation (includes decommissioning, obliterations, and/or road storage)	<ul style="list-style-type: none"> If within High-quality Spring habitat, the use occurs only outside the Spring Period. Complies with Administrative Use Levels if applicable. 	NLAA
		Road maintenance - blading, culvert cleaning, brushing, etc.	<ul style="list-style-type: none"> Does not change maintenance levels. Use occurs on existing Open Roads or, if on Restricted Roads, use does not exceed Administrative Use Levels. 	NLAA
		New temporary road construction and use OR Temporarily opening a restricted road	<ul style="list-style-type: none"> If within High-quality Spring habitat, the use occurs outside the Spring Period. Road use does not affect Core or Secure Habitat. Length of construction and use is < ½ mile. Use is restricted to administrative use (not open to motorized use by the public) by gate or other physical closure device. Duration of existence and use is limited to ≤3 years (for newly constructed road). Use occurs and road is returned to an impassible state in ≤3 years (for a temporarily opened restricted road). 	NLAA

#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
		Bridge or stream culvert replacement	<ul style="list-style-type: none"> • If located within High-quality Spring habitat, project occurs outside the Spring period. • Use occurs on existing Open Roads or if on Restricted Roads, use does not exceed Administrative Use Levels. 	NLAA
12	Silviculture Activities	<i>Reforestation</i> —hand planting	<ul style="list-style-type: none"> • Use occurs on existing Open Roads or if on Restricted Roads, use does not exceed Administrative Use Levels. • Includes ‘bear country safety’ messaging. 	NLAA
		<i>Insect suppression</i> —Aerial chemical application (reference aircraft use guidelines in # 2 above as well)	<ul style="list-style-type: none"> • Chemical application does not affect the cutworm moth and/or its habitat. 	NLAA
		<i>Insect suppression</i> —Ground chemical application	<ul style="list-style-type: none"> • Use occurs on existing Open Roads or, if on Restricted Roads, use does not exceed Administrative Use Levels. • Includes ‘bear country safety’ messaging. 	NLAA
		Insect suppression surveys, fertilization, manual treatment, individual tree fire treatment, or pheromone treatment	<ul style="list-style-type: none"> • Use occurs on existing Open Roads or if on Restricted Roads, use does not exceed Administrative Use Levels. • Day use only, OR if camping at dispersed sites ≤ 20 individuals. • Includes ‘bear country safety’ messaging. 	NLAA
		Precommercial thinning	<ul style="list-style-type: none"> • Use occurs along existing Open Roads or, if on Restricted Roads, use does not exceed Administrative Use Levels. • Includes ‘bear country safety’ messaging. 	NLAA
		Gopher Control using strychnine-treated bait consisting of oat or other grain	<ul style="list-style-type: none"> • Motorized vehicle use occurs on existing Open Roads OR if on Restricted Roads, use does not exceed Administrative Use Levels. • Includes ‘bear country safety’ messaging. • Handling will strictly follow label instructions, using the minimum amount needed to achieve desired results but no more than 1.0 pound per acre in rows at least ten feet apart. • Application will consist of no more than one teaspoon of bait per burrow. • The application will be monitored by a Forest Service employee who has been trained in animal damage control. 	NLAA

#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
		Gopher Control using strychnine-treated bait consisting of oat or other grain (continued).	<ul style="list-style-type: none"> • Bait will only be applied in areas with documented gopher activity. • Bait will not be applied more than once per year. • Bait will not be applied before July, and only during the dry season when soil moisture content is moderate to low, and when heavy precipitation is unlikely. • Bait will not be applied in preferred seasonal habitat when grizzly bears are likely to be present. • Bait will not be applied during periods when grizzly bears are known to forage on gophers or non-target rodents. • Transport and handling will be done to avoid any risk of spills or leakage. A spill plan will be maintained and followed. Any spilled bait will be retrieved immediately to the degree that the risk of accidental or incidental consumption by grizzly bears is negligible. • Storage and disposal will assure bait is inaccessible to bears. Bait will be prepared prior to going out into the field. • Effectiveness monitoring will be completed, and evidence of non-target mortality collected and reported to the District Wildlife Biologist. Tissue analysis will be performed by an EPA-acceptable lab to determine if strychnine was the cause of death or a contributing factor. If so, the program will halt and the Regional Consultation Team will be notified. 	
		<i>Disease control</i> – manual treatment of larch through girdling to control larch mistletoe	<ul style="list-style-type: none"> • Use occurs on existing Open Roads or, if on Restricted Roads, use does not exceed Administrative Use Levels. 	NLAA

#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
13	Special Uses (Non-Recreation)	This includes maintenance of existing sites or new construction at existing sites, corridors, or other facilities and is often carried out by the entity that owns the structures or facilities.	<ul style="list-style-type: none"> Motorized vehicle use occurs on existing Open Roads OR if on Restricted Roads, use does not exceed Administrative Use Levels. Does not include construction at new sites nor expansion of the existing Footprint of existing sites. Includes 'bear country safety' messaging. 	NLAA
		Research and Monitoring Activities by outside entities/groups that required a permit	<ul style="list-style-type: none"> Motorized vehicle use occurs on existing Open Roads OR if on Restricted Roads, use does not exceed Administrative Use Levels. Includes 'bear country safety' messaging. 	NLAA
14	Special Uses (Recreation -- Outfitter and Guide Permits and Events)	Non-denning season recreation special uses	<ul style="list-style-type: none"> Activity would not lead to potential disturbance of bears from High-quality Spring or Fall forage resources or Core or Secure Habitat. Linear events (i.e. races, poker runs, fun runs, and driving tours) occur only during daytime and not between 1/2 after sunset and 1/2 hour before sunrise. Other than hiking and cross-country skiing, linear activities occur on existing Roads that are open to wheeled motorized travel and/or ALL trails. Events have ≤ 100 participants—including organizers. Does not result in an increase in use of more than approximately 20 parties/week on Restricted Roads or non-motorized trails. Permit includes "bear country safety" education message and other measures to reduce potential for bear-human conflicts. Food/equipment caching would not lead to potential for attraction. Does not involve actions that have the potential for grizzly bears to be chased or pursued. All camping must meet criteria in Activity Component "Camping" above. 	NLAA

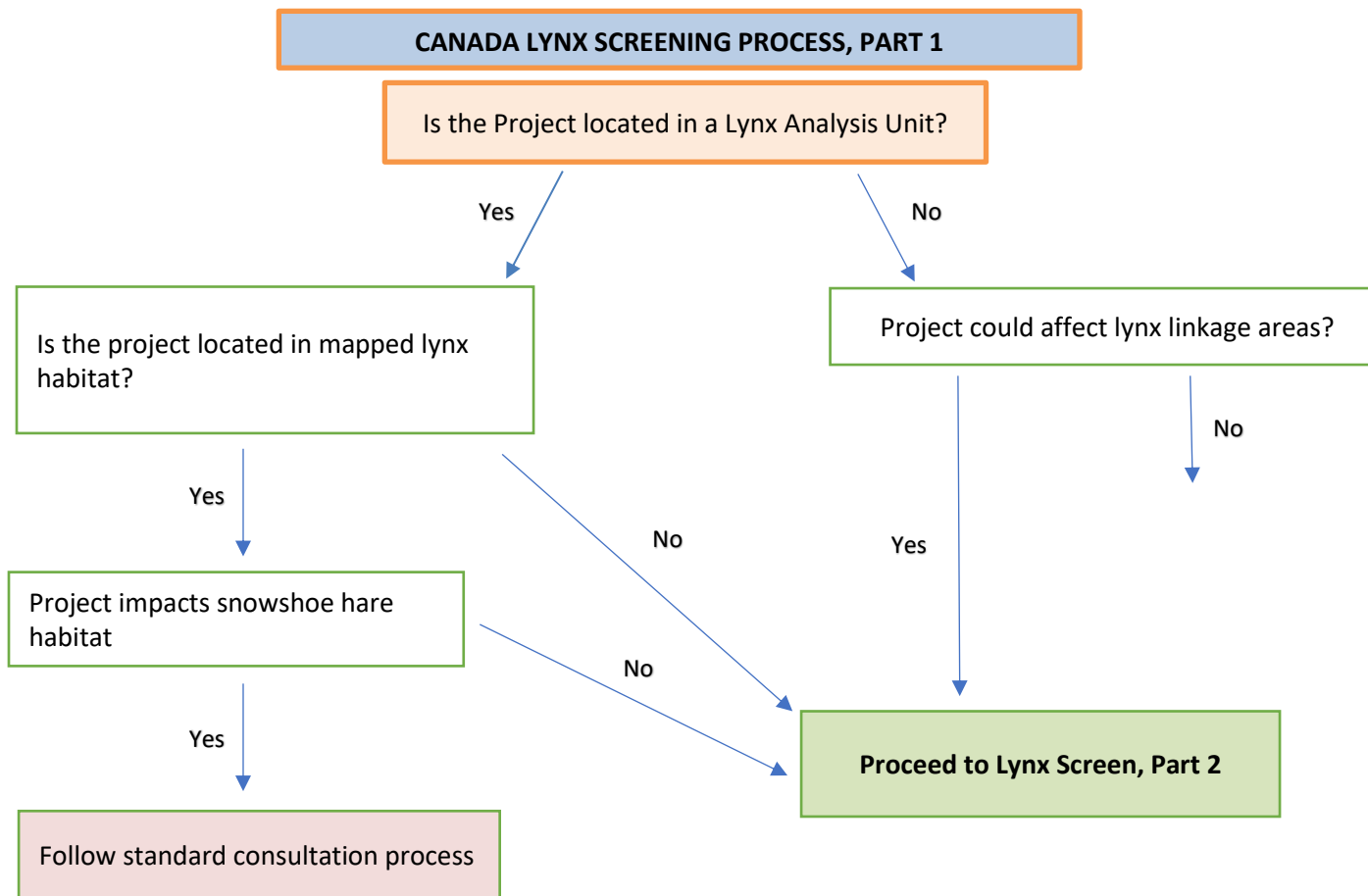
#	Activity Type	Activity Component	Screening Criteria ⁵	Determination
		Denning season recreation special uses (<i>See the non-denning season for this Activity Type for any activities occurring during den-emergence season</i>).	<ul style="list-style-type: none"> Motorized oversnow activity occurs only where it is open to such public motorized Access Management Direction. 	NLAA
15	Timber Harvest	Harvest, skidding, and/or hauling of timber products, including salvage, <i>other than activities that meet the screens for Activity Type # 6.</i>	NA	Potential LAA, Follow Standard Consultation
16	Watershed Restoration	Includes erosion control structures, sediment control, monitoring; also, see reforestation, timber harvest, mechanical treatments, etc.	<ul style="list-style-type: none"> If located within High-quality Spring habitat, it occurs outside Spring bear season OR completed in ≤ 2 day. Motorized vehicle use occurs on existing Open Roads OR if on Restricted Roads, use does not exceed Administrative Use Levels. Includes 'bear country safety' messaging. 	NLAA
17	Weed Management	Includes chemical, aerial (see above), or ground application of herbicide, biological controls, installation of matting.	<ul style="list-style-type: none"> Does not include sheep or goat grazing. Motorized use occurs on existing Open Roads, OR If on Restricted Roads, use does not exceed Administrative Use Levels. Includes 'bear country safety' messaging. 	NLAA
18	Miscellaneous	Activity component not listed specifically elsewhere in this Table	<ul style="list-style-type: none"> Must meet all screening criteria in Parts 1 and 2 of the screens table for all activity types and not violate any of these criteria. 	NLAA

APPENDIX B: Canada Lynx Screens

CANADA LYNX PROJECT SCREENING ELEMENTS & DETERMINATIONS

The screen for Canada lynx is a two-part process. Projects are initially screened through Part 1 (Flow Chart) to determine whether the project needs to instead be carried forward through standard consultation procedures. Part 2 consists of tables (B1 and B2). Although all NRLMD must be followed for a project to meet the screens, these tables list specific guidelines that are not discretionary for some activity types. Activities in areas that do not affect habitat but may cause disturbance to lynx have been analyzed on pages 20 and 21 and were determined to result in insignificant or discountable effects. These activities are not discussed further in Table B2. The U.S. Fish and Wildlife Service has determined in their Biological Opinion that the NRLMD would not jeopardize lynx; however, it is possible that a project may not meet a specific guideline and the determination of effects could be *“not likely to adversely affect.”*

The *“not likely to adversely affect”* (NLAA) determination reflects a conservative determination. There may be activities listed as NLAA in Tables B1 and B2 that upon site-specific analyses warrant a *“no effect”* (NE) determination, which can be selected at the discretion of the Biologist, in which case only in-house documentation is needed.



CANADA LYNX SCREENING PROCESS, PART 2 (Tables B1 and B2)

Table B1. Screening criteria for Canada lynx for Projects included in the NRLMD (or as it is modified and incorporated into a revised Forest Land Management Plan). Refer to Appendix C for terminology.

#	Activity Type	Activity Component	Screening Criteria	Determination
1	Any Activity Outside of an LAU	Any	<ul style="list-style-type: none"> Does not present a barrier to lynx movements through the landscape. Meets all NRLMD ALL and LINK objectives, standards and guidelines. 	NLAA
2	Range Management	Livestock grazing in post-fire and post-harvest areas	<ul style="list-style-type: none"> Meets NRLMD GRAZG1. 	NLAA
		Livestock grazing in aspen stands	<ul style="list-style-type: none"> Meets NRLMD GRAZG2. 	NLAA
		Livestock grazing in shrub-steppe habitats	<ul style="list-style-type: none"> Meets NRLMD GRAZG4. 	NLAA
		Livestock grazing in riparian areas or willow cars	<ul style="list-style-type: none"> Meets NRLMD GRAZG3. 	NLAA
3	Recreation Management	Snowmobiling and other over-the-snow activity such as cross-country skiing, snowshoe races, and dogsledding	<ul style="list-style-type: none"> Meets NRLMD HUG11. 	NLAA
		New or expanded developed recreation facilities (such as ski lifts, parking lots, buildings, picnic tables, toilet facilities – see NRLMD glossary)	<ul style="list-style-type: none"> Activity has no potential to result in loss of current or potential snowshoe hare habitat. If in a ski area, activity occurs within the permitted area. 	NLAA
		<i>Recreation Special Uses</i> - This includes activities for which permits are issued and includes outfitting and permits issued to a variety of organizations that engage in activities such as mountaineering, rock climbing, outward bound, ski races, concerts, “Poker Runs,” “Fun Runs,” driving tours, nature watch hikes, hunting, fishing, and a wide variety of other events	<ul style="list-style-type: none"> Does not involve actions that have the potential for Canada lynx to be chased or pursued. 	NLAA
		<i>Maintenance and/or Trail Re-routes</i> - This consists of maintenance of trails and trail re-routes that may require use of heavy equipment and/or blasting	<ul style="list-style-type: none"> Meets NRLMD HUG3, HUG7, and HUG11 and does not result in an impact to snowshoe hare habitat. 	NLAA
		<i>New Trail Construction</i> - This includes the development of new trails used for foot, stock, or motorcycles and may require the use of heavy equipment, blasting and/or hand tools and may create a clearing width up to 10 feet wide (FSH 2309.18)	<ul style="list-style-type: none"> Meets NRLMD HUG7 and does not result in an impact to snowshoe hare habitat. 	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
		<i>Permitted and Non-permitted use of Developed Sites, Facilities, and Their Maintenance</i> - including special use permits issued for facilities, residences, and other structures; permits are also issued for organizational camps such as the Boy Scouts and church groups at developed campgrounds; other facilities include but are not limited to campgrounds, rental cabins, watchable wildlife sites, picnic areas, warming huts, and communication sites; also includes FS administrative sites and their maintenance	<ul style="list-style-type: none"> No potential to result in impact to snowshoe hare habitat. If associated with downhill skiing or similar activity, no increase in the existing footprint of heavily used area. 	NLAA
4	Road Construction	Highway or forest highway construction	NA	Potential LAA, Follow Standard Consultation
5	Salvage Harvest	<i>Burned Habitat</i> - Includes salvage harvest of high intensity burned areas that converted habitat to stand initiation structural stage that does not yet provide snowshoe hare habitat	<ul style="list-style-type: none"> Salvage operations occur before regeneration is established or on snow or if via helicopter logging. No more than 250 acres per LAU per year. Meets NRLMD VEGS1, VEGS2, VEGG11. No incidental removal of residual snowshoe hare habitat⁹ (see also NRLMD VEGS6). 	NLAA
		<i>Non-burned Habitat</i> - Includes salvage harvest of dead, damaged, and dying trees in stands where > 90% of the overstory is dead due to causes other than high-intensity fire	<ul style="list-style-type: none"> Salvage operations occur before regeneration is established, or by helicopter or on snow. No more than 250 acres per LAU per year. Meets NRLMD VEGS1, VEGS2, VEGG11. No incidental removal of residual snowshoe hare habitat⁵ (see also NRLMD VEGS6). 	NLAA
6	Silviculture Activities	Tree planting or tree disease control	<ul style="list-style-type: none"> Activity does not result in stand type conversion that impacts potential lynx habitat (see also NRLMD VEG G1). 	NLAA
7	Vegetation Management	Vegetation management (other than Salvage Harvest) that is NOT in snowshoe hare habitat and that would not impact development of future snowshoe hare habitat	<ul style="list-style-type: none"> Meets all NRLMD standards and guidelines or as incorporated into revised Forest Plans. 	NLAA

⁹ All references to snowshoe hare habitat mean summer and/or winter habitat.

Table B2. Screening criteria for projects not specifically included in the Northern Rockies Lynx Management Direction. Remember to screen all appropriate activity types involved in implementation of the project. Refer to Appendix C for terminology.

#	Activity Type	Activity Component	Screening Criteria	Determination
1	Ditches and Diversions	NA	<ul style="list-style-type: none"> Activities do not impact snowshoe hare habitat. 	NLAA
2	Forest Products	<i>Post and Pole Sales</i> – This includes both commercial and non-commercial post and pole sales and typically occurs in forested stands consisting of trees 5-9” diameter at breast height	<ul style="list-style-type: none"> Meets NRLMD VEG G1, VEG G5, and VEG G11. Does not occur in snowshoe hare habitat. 	NLAA
		<i>Firewood Collection, Christmas Tree/Bough Cutting, and Other Forest Products</i> – This includes both commercial and non-commercial collection	<ul style="list-style-type: none"> Meets NRLMD VEG G1 and VEG G5. 	NLAA
3	Habitat Restoration	<i>Forest and Shrub/Grassland Habitat Management</i> - This includes aspen rejuvenation, shrub field maintenance and other types of ecosystem ‘driven’ projects designed to promote natural processes in an area	<ul style="list-style-type: none"> Meets NRLMD VEG G1, VEG G4, VEG G5, VEG G10, and VEG G11. Project does not impact snowshoe hare habitat. 	NLAA
4	Hardrock Mining & Gravel Pits	Quarries, recreational mining (includes dredging), small mines, exploratory drilling, and reclamation of small mines	<ul style="list-style-type: none"> Activities do not impact snowshoe hare habitat. 	NLAA
5	Roads and Road Maintenance	<i>Road Maintenance</i> - This includes general road maintenance that may involve the brushing of vegetation on the road or along roadsides; road maintenance may include but is not limited to roadbed blading, brushing, cleaning ditches, replacing or cleaning culverts, cleaning dips, or spot graveling	<ul style="list-style-type: none"> Meets NRLMD HUG8. (<i>NOTE: Brushing activities where incidental snowshoe hare habitat removal occurs was considered baseline for the consultation on NRLMD</i>). 	NLAA
		<i>Hazard Tree Removal</i>	<ul style="list-style-type: none"> Tree removal does not result in an impact to snowshoe hare habitat. 	NLAA
		<i>Road Decommissioning</i> - This involves the use of heavy equipment and includes obliteration, road storage and other methods to hydrologically neutralize the road	<ul style="list-style-type: none"> Does not permanently impact snowshoe hare habitat. 	NLAA
		<i>Road Upgrades and Bridge Replacement</i>	<ul style="list-style-type: none"> Meets NRLMD HUG6 and does not result in a reduction of snowshoe hare habitat. 	NLAA
		<i>General Road Use</i> - This includes hauling timber, removing mining waste and materials, and moving	NA	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
		livestock over federal roads for which permits are required; it also includes routine road use by administrative units to carry out work associated with recreation, range, timber and minerals management, fire prevention and suppression, inventories, surveys, and other monitoring activities; this includes use of roads consistent with existing travel plans		
		<i>New Permanent or Temporary Road Construction</i> (Language from Bear section = New temporary road construction and use OR Temporarily opening a restricted road)	<ul style="list-style-type: none"> Meets NRLMD HUG7 and HUG9 and does not impact snowshoe hare habitat. 	NLAA
6	Non-recreation Special Uses	This includes non-recreation special uses (including activities such as research, monitoring or filming that require a permit) and mineral and energy exploration and development and maintenance of existing sites, corridors, or other facilities and is often carried out by the entity that owns the structures or facilities. Maintenance may include vegetation blading, cutting, or spraying to reduce brush and reduce the invasion of shrubs and trees among other activities.	<ul style="list-style-type: none"> Meets NRLMD HUG4 and HUG12 and does not result in a reduction of snowshoe hare habitat. 	NLAA
7	Surveys	This includes snow course surveys, patrols, track counts, habitat sampling, hair posts, remote camera stations, and radio telemetry among other methods	NA	NLAA
8	Weed Management	This includes chemical and biological treatments to noxious weeds within or adjacent to lynx habitat and can include aerial or ground application	NA	NLAA
9	Miscellaneous	Activity component not listed specifically above	<ul style="list-style-type: none"> Must meet all screening criteria in Parts 1 and 2 of the screens table for all activity types and not violate any of these criteria 	NLAA

Table B3. Northern Rockies Lynx Management Direction Standards and Guidelines (or as it is modified and incorporated into a revised Forest Land Management Plan).

Northern Rockies Lynx Management Direction
<p>ALL MANAGEMENT PRACTICES AND ACTIVITIES (ALL) <i>The following objectives, standards and guidelines apply to management projects in lynx habitat in lynx analysis units (LAU) and in linkage areas, subject to valid existing rights. They do not apply to wildfire suppression, or to wildland fire use</i></p>
<p>Objective³⁰ ALL O1 Maintain²⁶ or restore³⁹ lynx habitat²³ connectivity¹⁶ in and between LAUs²¹, and in linkage areas²².</p>
<p><u>Standard⁴³ ALL S1</u> New or expanded permanent developments³³ and vegetation management projects⁴⁸ must maintain²⁶ habitat connectivity¹⁶ in an LAU²¹ and/or linkage area²².</p>
<p>Guideline¹⁵ ALL G1 Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways¹⁸ or forest highways¹² across federal land. Methods could include fencing, underpasses or overpasses.</p>
<p><u>Standard LAU S1</u> <i>Changes in LAU²¹ boundaries shall be based on site-specific habitat information and after review by the Forest Service Regional Office.</i></p>
<p><u>VEGETATION MANAGEMENT PROJECTS (VEG)</u> <i>The following objectives, standards and guidelines apply to vegetation management projects in lynx habitat in lynx analysis units (LAU). With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments like mineral operations, ski runs, roads and the like. None of the objectives, standards, or guidelines apply to linkage areas.</i></p>
<p><u>Standard VEG S1</u> – Stand initiation structural stage limits Standard VEG S1 applies to all vegetation management⁴⁸ projects that regenerate³⁷ timber, except for fuel treatment¹³ projects within the wildland urban interface (WUI)⁴⁹ as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10. The Standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages⁴⁴ limit disturbance in each LAU as follows: If more than 30 percent of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects.</p>
<p><u>Standard VEG S2</u> – Limits on regeneration from timber mgmt. projects Standard VEG S2 applies to all vegetation management⁴⁸ projects that regenerate³⁷ timber, except for fuel treatment¹³ projects within the wildland urban interface (WUI)⁴⁹ as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI⁴⁹ that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI⁴⁹ see guideline VEG G10. The Standard: Timber management projects shall not regenerate³⁷ more than 15 percent of lynx habitat on NFS lands in an LAU in a ten-year period.</p>

Northern Rockies Lynx Management Direction

[Guideline VEG G11](#) – Denning habitat

Denning habitat⁶ should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees (“jack-strawed” piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris⁴, piles, or residual trees to provide denning habitat⁶ in the future.

[Standard VEG S5](#) – Precommercial thinning limits

Standard VEG S5 applies to all precommercial thinning³⁵ projects, except for fuel treatment¹³ projects that use precommercial thinning as a tool within the wildland urban interface (WUI)⁴⁹ as defined by HFRA, subject to the following limitation:

Fuel treatment projects within the WUI⁴⁹ that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects within the WUI⁴⁹ see guideline VEG G10.

The Standard: Precommercial thinning projects that reduce snowshoe hare habitat, may occur from the stand initiation structural stage⁴⁴ until the stands no longer provide winter snowshoe hare habitat only:

1. Within 200 feet of administrative sites, dwellings, or outbuildings; or
2. For research studies³⁸ or genetic tree tests evaluating genetically improved reforestation stock; or
3. Based on new information that is peer reviewed and accepted by the regional levels of the Forest Service and FWS, where a written determination states:
 - ⇒ that a project is not likely to adversely affect lynx; or
 - ⇒ that a project is likely to have a short term adverse effect on lynx or its habitat, but would result in long term benefits to lynx and its habitat.
4. For conifer removal in aspen, or daylight thinning⁵ around individual aspen trees, where aspen is in decline; or
5. For daylight thinning of planted rust-resistant white pine where 80 % of the winter snowshoe hare habitat⁵⁰ is retained; or
6. To restore whitebark pine.

Northern Rockies Lynx Management Direction
<p>Standard VEG S6 – Multi-storied stands & snowshoe hare horizontal cover</p> <p>Standard VEG S6 applies to all vegetation management⁴⁸ projects that regenerate³⁷ timber, except for fuel treatment¹³ projects within the wildland urban interface (WUI)⁴⁹ as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI⁴⁹ that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).</p> <p>For fuel treatment projects within the WUI⁴⁹ see guideline VEG G10.</p> <p>The Standard: Vegetation management projects that reduce snowshoe hare habitat in multi-story mature or late successional forests²⁹ may occur only:</p> <ol style="list-style-type: none"> 1. Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries; or 2. For research studies³⁸ or genetic tree tests evaluating genetically improved reforestation stock; or 3. For incidental removal during salvage harvest⁴¹ (e.g. removal due to location of skid trails). <p>(NOTE: Timber harvest is allowed in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover [e.g. uneven age management systems could be used to create openings where there is little understory so that new forage can grow]).</p> <p><i>[Standard VEG S6 differs on Flathead National Forest, with its addition of Exception #4: “For noncommercial felling of trees larger than sapling size within 200 feet of whitebark pine trees (in stands that contain trees identified for cone/scion/pollen collection) to make whitebark pine more likely to survive wildfires, more resistant to mountain pine beetle attack, and more likely to persist in future environments”].</i></p>
<p>Guideline VEG G1 – Lynx habitat improvement</p> <p>Vegetation management⁴⁸ projects should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority should be given to stem-exclusion, closed-canopy structural stage⁴⁴ stands for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat⁵⁰ should be near denning habitat⁶.</p>
<p>Guideline VEG G4 – Prescribed Fire</p> <p>Prescribed fire³⁴ activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.</p>
<p>Guideline VEG G5 – Habitat for alternate prey species</p> <p>Habitat for alternate prey species, primarily red squirrel³⁶, should be provided in each LAU.</p>
<p>Guideline VEG G10 – Fuel treatments in the WUI</p> <p><i>Fuel treatment projects in the WUI⁴⁹ as defined by HFRA^{17, 48} should be designed considering standards VEG S1, S2, S5, and S6 to promote lynx conservation.</i></p>
<p>LIVESTOCK MANAGEMENT (GRAZ)</p> <p><i>The following objectives and guidelines apply to grazing projects in lynx habitat in lynx analysis units (LAU). They do not apply to linkage areas.</i></p>
<p>Guideline GRAZ G1 – Livestock grazing and openings</p> <p>In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.</p>
<p>Guideline GRAZ G2 – Livestock grazing and aspen</p> <p>In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.</p>
<p>Guideline GRAZ G3 – Livestock grazing and riparian areas & willow carrs</p> <p>In riparian areas⁴⁰ and willow carrs³, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages²⁸, similar to conditions that would have occurred under historic disturbance regimes.</p>

Northern Rockies Lynx Management Direction
<p>Guideline GRAZ G4 – Livestock grazing and shrub-steppe habitats</p> <p>In shrub-steppe habitats⁴², livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs²¹, to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.</p>
<p>HUMAN USE PROJECTS (HU)</p> <p>The following objectives and guidelines apply to <i>human use projects, such as special uses (other than grazing), recreation management, roads, highways, mineral and energy development, in lynx habitat in lynx analysis units (LAU)</i>, subject to valid existing rights. <i>They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.</i></p>
<p>Guideline HU G1 – Ski area expansion & development, inter-trail islands</p> <p>When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris⁴, so winter snowshoe hare habitat⁴⁹ is maintained.</p>
<p>Guideline HU G2 – Ski area expansion & development, foraging habitat</p> <p>When developing or expanding ski areas, foraging should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.</p>
<p>Guideline HU G3 – Recreation developments</p> <p>Recreation developments and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat²³.</p>
<p>Guideline HU G4 – Mineral & energy development</p> <p>For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.</p>
<p>Guideline HU G5 – Mineral & energy development, habitat restoration</p> <p>For mineral and energy development sites and facilities that are closed, a reclamation plan that restores³⁹ lynx habitat should be developed.</p>
<p>Guideline HU G6 – Roads, upgrading</p> <p>Methods to avoid or reduce effects to lynx should be used in lynx habitat when upgrading unpaved roads to maintenance levels 4 or 5, if the result would be increased traffic speeds and volumes, or a foreseeable contribution to increases in human activity or development.</p>
<p>Guideline HU G7 – Roads, locations</p> <p>New permanent roads should not be built on ridge-tops and saddles, or in areas identified as important for lynx habitat connectivity¹⁶.</p> <p>New permanent roads and trails should be situated away from forested stringers.</p>
<p>Guideline HU G8 – Roads, brushing</p> <p>Cutting brush along low-speed²⁵, low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.</p>
<p>Guideline HU G9 – Roads, new</p> <p>On new roads built for projects, public motorized use should be restricted. Effective closures should be provided in road designs. When the project is over, these roads should be reclaimed or decommissioned, if not needed for other management objectives.</p>
<p>Guideline HU G10 – Roads, ski area access</p> <p><i>When developing or expanding ski areas and trails, access roads and lift termini to maintain and provide lynx security¹⁰ habitat.</i></p>

Northern Rockies Lynx Management Direction
<p style="text-align: center;">Guideline HU G11 – Snow compaction</p> <p>Designated over-the-snow routes, or designated play areas, should not expand outside baseline areas of consistent snow compaction¹, unless designation serves to consolidate use and improve lynx habitat. This is calculated on an LAU basis, or on a combination of immediately adjacent LAUs.</p> <p>This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HU G12.</p> <p>Use the same analysis boundaries for all actions subject to this guideline.</p> <p><i>[Guideline HU G11 differs on Flathead National Forest, where it reads: “To provide ecological conditions to support Canada lynx on NFS lands at a forestwide scale, there should be no net increase in miles of designated routes for motorized over-snow vehicle use, groomed routes, or areas where motorized over-snow vehicle use is identified as suitable. The “no net increase” is in comparison to the suitability displayed in forest plan figure B-11. This guideline does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HU G12.”]</i></p>
<p style="text-align: center;">Guideline HU G12 – Winter access for non-recreation SUP & mineral & energy development</p> <p>Winter access for non-recreation special uses, and mineral and energy exploration and development, should be limited to designated routes⁸ or designated over-the-snow routes⁷.</p>
<p>LINKAGE AREAS (LINK)</p> <p>The following objective, standard and guidelines apply to <i>all projects within linkage areas</i>, subject to valid existing rights.</p>
<p style="text-align: center;">Standard LINK S1 – Highway or forest highway construction in linkage areas</p> <p>When highway¹⁸ or forest highway¹² construction or reconstruction is proposed in linkage areas²², identify potential highway crossings.</p>
<p style="text-align: center;">Guideline LINK G1 – Land exchanges</p> <p>NFS lands should be retained in public ownership.</p>
<p style="text-align: center;">Guideline LINK G2 – Livestock grazing in shrub-steppe habitats</p> <p><i>Livestock grazing in shrub-steppe habitats⁴² should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages²⁸, similar to conditions that would have occurred under historic disturbance regimes.</i></p>
<p>REQUIRED MONITORING</p>
<p><i>Map the location and intensity of snow compacting activities, and designated and groomed routes that occurred inside LAUs during the period of 1998 to 2000. The mapping is to be completed within one year of this decision and changes in activities and routes are to be monitored every five years after the decision.</i></p>
<p>Annually report the number of acres where any of the exemptions 1 through 6 listed in Standard VEG S5 were applied. Report the type of activity, the number of acres, and the location (by unit, and LAU²¹).</p>
<p>Report the acres of fuel treatment in lynx habitat within the wildland urban interface⁴⁹ as defined by HFRA¹⁷ when the project decision is approved. Report whether or not the fuel treatment met the vegetation standard. If standard(s) are not met, report, which standard(s) are not, met, why they were not met, and how many acres were affected. Units will report to their respective USFS Regional Office. Region 1 of the USFS will consolidate all reports.</p>

APPENDIX C: Definitions from the Northern Rockies Lynx Management Direction

¹ **Areas of consistent snow compaction** – An area of consistent snow compaction is an area of land or water that during winter is generally covered with snow and gets enough human use that individual tracks are indistinguishable. In such places, compacted snow is evident most of the time, except immediately after (within 48 hours) snowfall. These can be areas or linear routes, and are generally found in near snowmobile or cross-country ski routes, in adjacent openings, parks and meadows, near ski huts or plowed roads, or in winter parking areas. Areas of consistent snow compaction will be determined based on the area or miles used in 1998 to 2000.

² **Broad scale assessment** – A broad scale assessment is a synthesis of current scientific knowledge, including a description of uncertainties and assumptions, to provide an understanding of past and present conditions and future trends, and a characterization of the ecological, social and economic components of an area. (LCAS)

³ **Carr** – Deciduous woodland or shrub land occurring on permanently wet, organic soil. (LCAS)

⁴ **Course woody debris** – Any piece(s) of dead woody material, e.g., dead boles, limbs, and large root masses on the ground or in streams. (LCAS)

⁵ **Daylight thinning** – Daylight thinning is a form of precommercial thinning that removes the trees and brush inside a given radius around a tree.

⁶ **Denning habitat (lynx)** – Denning habitat is the environment lynx use when giving birth and rearing kittens until they are mobile. The most common component is large amounts of coarse woody debris to provide escape and thermal cover for kittens. Denning habitat must be within daily travel distance of winter snowshoe hare habitat – the typical maximum daily distance for females is about three to six miles. Denning habitat includes mature and old growth²⁴ forests with plenty of coarse woody debris. It can also include young regenerating forests with piles of coarse woody debris, or areas where down trees are jack-strawed.

⁷ **Designated over-the-snow routes** – Designated over-the-snow routes are routes managed under permit or agreement or by the agency, where use is encouraged, either by on-the-ground marking or by publication in brochures, recreation opportunity guides or maps (other than travel maps) or in electronic media produced or approved by the agency. The routes identified in outfitter and guide permits are designated by definition; groomed routes also are designated by definition. The determination of baseline snow compaction will be based on the miles of designated over-the-snow routes authorized, promoted or encouraged in 1998 to 2000.

⁸ **Designated route** – A designated route is a road or trail that has been identified as open for specified travel use.

⁹ **Developed recreation** – Developed recreation requires facilities that result in concentrated use. For example, skiing requires lifts, parking lots, buildings and roads; campgrounds require roads, picnic tables and toilet facilities.

¹⁰ **Security habitat (lynx)** – Security habitat amounts to places in lynx habitat that provide secure winter bedding sites for lynx in highly disturbed landscapes like ski areas. Security habitat gives lynx the ability to retreat from human disturbance. Forest structures that make human access difficult generally discourage human activity in security habitats. Security habitats are most effective if big enough to provide visual and acoustic insulation and to let lynx easily move away from any intrusion. They must be close to winter snowshoe hare habitat. (LCAS)

¹¹ **Fire use** – Fire use is the combination of wildland fire use and using prescribed fire to meet resource objectives. (NIFC) Wildland fire use is the management of naturally ignited wildland fires to accomplish resource management objectives in areas that have a fire management plan. The use of the term wildland fire use replaces the term prescribed natural fire. (Wildland and Prescribed Fire Management Policy, August 1998)

¹² **Forest highway** – A forest highway is a forest road under the jurisdiction of, and maintained by, a public authority and open to public travel (USC: Title 23, Section 101(a)), designated by an agreement with the FS, state transportation agency and Federal Highway Administration.

¹³ **Fuel treatment** – A fuel treatment is a management action that reduces the threat of ignition and fire intensity or rate of spread, or is used to restore fire-adapted ecosystems.

¹⁴ **Goal** – A goal is a broad description of what an agency is trying to achieve, found in a land management plan. (LCAS)

¹⁵ **Guideline** – A guideline is a particular management action that should be used to meet an objective found in a land management plan. The rationale for deviations may be documented, but amending the plan is not required. (LCAS modified)

¹⁶ **Habitat connectivity (lynx)** – Habitat connectivity consists of an adequate amount of vegetation cover arranged in a way that allows lynx to move around. Narrow forested mountain ridges or shrub-steppe plateaus may serve as a link between more extensive areas of lynx habitat; wooded riparian areas may provide travel cover across open valley floors. (LCAS)

¹⁷ **HFRA (Healthy Forests Restoration Act)** - Public Law 108-148, passed in December 2003. The HFRA provides statutory processes for hazardous fuel reduction projects on certain types of at-risk National Forest System and Bureau of Land Management lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. (Modified from Forest Service HFRA web site.)

¹⁸ **Highway** – The word highway includes all roads that are part of the National Highway System. (23 CFR 470.107(b))

¹⁹ **Horizontal cover** – Horizontal cover is the visual obscurity or cover provided by habitat structures that extend to the ground or snow surface primarily provided by tree stems and tree boughs, but also includes herbaceous vegetation, snow, and landscape topography. Horizontal cover was measured by John Squires et al. (pers. com.) in Northwestern Montana according to the following methodology:

“A canvas cover-board (2 m x 0.5 m) was erected 10 m from plot center in 4 directions (forward track, back track, and at 2, 90° angles) was read to directly measure horizontal cover. The cover board was divided into 4, 0.5 meter blocks and each block was further divided into quarters. At each reading, technicians estimated horizontal cover by 10% class at each of the 4 heights; these 4 estimates were then averaged for an overall estimate of that reading.” (According to Squires via pers. com., cover measured during the summer period averaged approximately 65% while at den sites it was measured at roughly 85%. During the winter period cover was measured at 45% while at winter kill sites it was slightly greater than 50%.)

²⁰ **Isolated mountain range** – Isolated mountain ranges are small mountains cut off from other mountains and surrounded by flatlands. On the east side of the Rockies, they are used for analysis instead of sub-basins. Examples are the Little Belts in Montana and the Bighorns in Wyoming.

²¹ **LAU (Lynx Analysis Unit)** – An LAU is an area of at least the size used by an individual lynx, from about 25 to 50 square miles (LCAS). An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant.

²² **Linkage area** – A linkage area provides connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where basins, valleys or agricultural lands separate blocks of lynx habitat, or where lynx habitat naturally narrows between blocks. (LCAS updated definition approved by the Steering Committee 10/23/01)

²³ **Lynx habitat** – Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat is generally occurs between 3,500 and 8,000 feet of elevation, and primarily consists of lodgepole pine, subalpine fir and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Douglas fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forests do not provide lynx habitat. (LCAS)

²⁴ **Lynx habitat in an unsuitable condition** – Lynx habitat in an unsuitable condition consists of lynx habitat in the stand initiation structural stage where the trees are generally less than ten to 30 years old and have not grown

tall enough to protrude above the snow during winter. Stand replacing fire or certain vegetation management projects can create unsuitable conditions. Vegetation management projects that can result in unsuitable habitat include clearcuts and seed tree harvest, and sometimes shelterwood cuts and commercial thinning depending on the resulting stand composition and structure. (LCAS)

²⁵ **Low-speed, low-traffic-volume road** – Low speed is less than 20 miles per hour; low volume is a seasonal average daily traffic load of less than 100 vehicles per day.

²⁶ **Maintain** – In the context of this amendment, maintain means to provide enough lynx habitat to conserve lynx. It does not mean to keep the status quo.

²⁷ **Maintenance level** – Maintenance levels define the level of service provided by and maintenance required for a road. (FSH 7709.58, Sec 12.3) Maintenance level 4 is assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most level 4 roads have double lanes and aggregate surfaced. Some may be single lane; some may be paved or have dust abated. Maintenance level 5 is assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane and paved, but some may be aggregate surfaced with the dust abated.

²⁸ **Mid-seral or later** – Mid-seral is the successional stage in a plant community that's the midpoint as it moves from bare ground to climax. For riparian areas, it means willows or other shrubs have become established. For shrub-steppe areas, it means shrubs associated with climax are present and increasing in density.

²⁹ **Multi-story mature or late successional forest** – This stage is similar to the *old multistory structural stage* (see below). However, trees are generally not as old and decaying trees may be somewhat less abundant.

³⁰ **Objective** – An objective is a statement in a land management plan describing desired resource conditions and intended to promote achieving programmatic goals. (LCAS)

³¹ **Old multistory structural stage** – Many age classes and vegetation layers mark the old forest, multistoried stage. It usually contains large old trees. Decaying fallen trees may be present that leave a discontinuous overstory canopy. On cold or moist sites without frequent fires or other disturbance, multi-layer stands with large trees in the uppermost layer develop. (Oliver and Larson, 1996)

³² **Old growth** – Old growth forests generally contain trees that are large for their species and site, and are sometimes decadent with broken tops. Old growth often contains a variety of tree sizes, large snags and logs, and a developed and often patchy understory.

³³ **Permanent development** – A permanent development is any development that results in a loss of lynx habitat for at least 15 years. Ski trails, parking lots, new permanent roads, structures, campgrounds and many special use developments would be considered permanent developments.

³⁴ **Prescribed fire** – A prescribed fire is any fire ignited as a management action to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements met, before ignition. The term replaces management ignited prescribed fire. (NWCG)

³⁵ **Precommercial thinning** – Precommercial thinning is mechanically removing trees to reduce stocking and concentrate growth on the remaining trees, and not resulting in immediate financial return. (Dictionary of Forestry)

³⁶ **Red squirrel habitat** – Red squirrel habitat consists of coniferous forests of seed and cone-producing age that usually contain snags and downed woody debris, generally associated with mature or older forests.

³⁷ **Regeneration harvest** – The cutting of trees and creating an entire new age class; an even-age harvest. The major methods are clear-cutting, seed tree, shelterwood, and group selective cuts (Helms 1998).

³⁸ **Research** – Research consists of studies conducted to increase scientific knowledge or technology. For the purposes of Standards VEG S5 and VEG S6, research applies to studies financed from the forest research budget (FSM 4040) and administrative studies financed from the NF budget.

³⁹ **Restore, restoration** – To restore is to return or re-establish ecosystems or habitats to their original structure and species composition. (Dictionary of Forestry)

⁴⁰ **Riparian area** – An area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation. (LCAS)

⁴¹ **Salvage harvest** – Salvage harvest is a commercial timber sale of dead, damaged or dying trees. It recovers economic value that would otherwise be lost. Collecting firewood for personal use is not considered salvage harvest.

⁴² **Shrub steppe habitat** – Shrub steppe habitat consists of dry sites with shrubs and grasslands intermingled.

⁴³ **Standard** – A standard is a required action in a land management plan specifying how to achieve an objective or under what circumstances to refrain from taking action. A plan must be amended to deviate from a standard.

⁴⁴ **Stand initiation structural stage** – The stand initiation stage generally develops after a stand-replacing disturbance by fire or regeneration timber harvest. A new single-story layer of shrubs, tree seedlings and saplings establish and develop, reoccupying the site. Trees that need full sun are likely to dominate these even-aged stands. (Oliver and Larson, 1996)

⁴⁵ **Stem exclusion structural stage** – In the stem exclusion stage, trees initially grow fast and quickly occupy all of the growing space, creating a closed canopy. Because the trees are tall, little light reaches the forest floor so understory plants (including smaller trees) are shaded and grow more slowly. Species that need full sunlight usually die; shrubs and herbs may become dormant. New trees are precluded by a lack of sunlight or moisture. (Oliver and Larson, 1996)

⁴⁶ **Timber management** – Timber management consists of growing, tending, commercially harvesting and regenerating crops of trees.

⁴⁷ **Understory re-initiation structural stage** – In the understory re-initiation stage, a new age class of trees gets established after overstory trees begin to die, are removed or no longer fully occupy their growing space after tall trees abrade each other in the wind. Understory seedlings then re-grow and the trees begin to stratify into vertical layers. A low to moderately dense uneven-aged overstory develops, with some small shade-tolerant trees in the understory. (Oliver and Larson, 1996)

⁴⁸ **Vegetation management projects** – Vegetation management projects change the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire and timber harvest. For the purposes of this amendment, the term does not include removing vegetation for permanent developments like mineral operations, ski runs, roads and the like, and does not apply to fire suppression or to wildland fire use.

⁴⁹ **Wildland urban interface (WUI)** - The area adjacent to an at-risk community that is identified in the community wildfire protection plan. If there is no community wildfire protection plan in place, the WUI is the area 0.5 mile from the boundary of an at-risk community or within 1.5 miles of the boundary of an at-risk community. The WUI could also include areas if the terrain is steep, or there is a nearby road or ridge top that could be incorporated into a fuel break, or the land is in condition class 3, or the area contains an emergency exit route needed for safe evacuations. (Condensed from HFRA. For full text see HFRA § 101.)

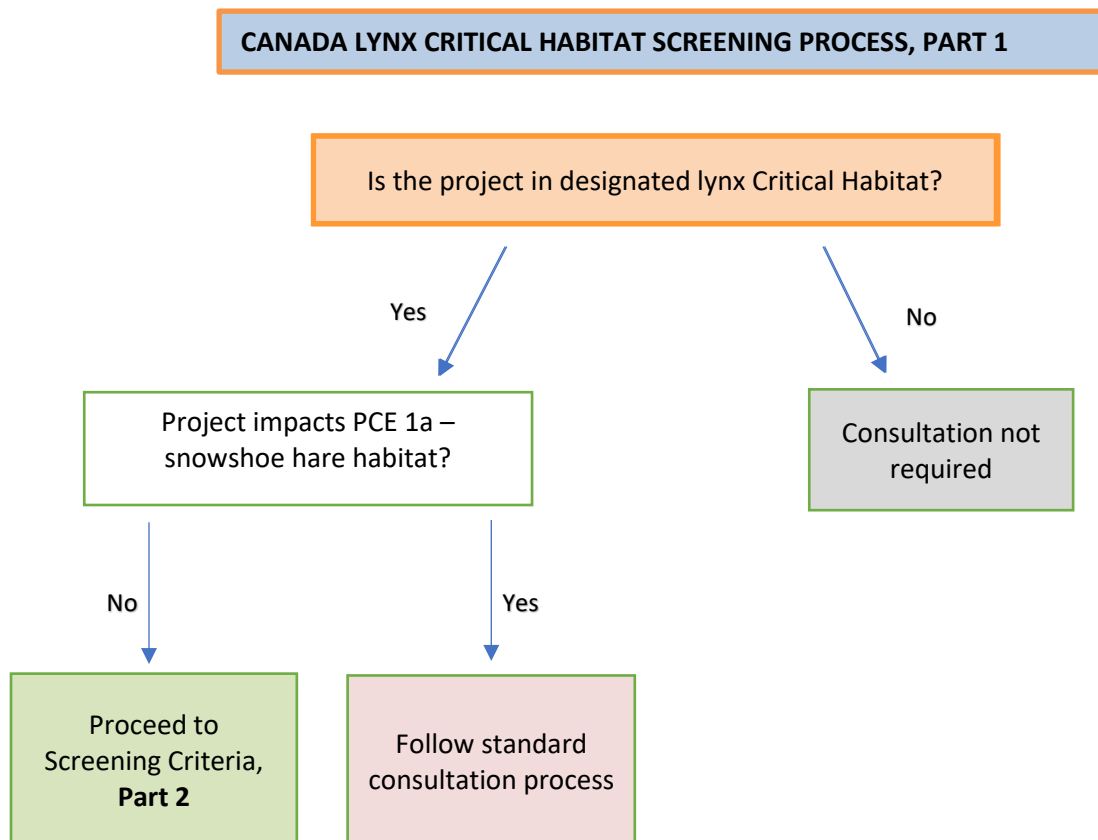
⁵⁰ **Winter snowshoe hare habitat** – Winter snowshoe hare habitat consists of places where young trees or shrubs grow dense – thousands of woody stems per acre – and tall enough to protrude above the snow during winter, so hares can browse on the bark and small twigs (Ruediger et al. 2000). Winter snowshoe hare habitat develops primarily in the stand initiation, understory reinitiation and old forest multistoried structural stage.

APPENDIX D: Canada Lynx Critical Habitat Screens

CANADA LYNX CRITICAL HABITAT PROJECT SCREENING ELEMENTS & DETERMINATIONS

Screening a project for lynx critical habitat is a two-part process. Projects are initially screened through the Flow Chart for designated critical habitat (below) to determine whether they can proceed or should be carried forward through standard consultation procedures. The second part consists of Table D1 which displays activity types, activity components, screening criteria, and effects determination.

The “*not likely to adversely affect*” (NLAA) determination reflects a conservative determination. There may be activities listed as NLAA in Tables D1 that upon site-specific analyses warrant a “*no effect*” (NE) determination, which can be selected at the discretion of the Biologist, in which case only in-house documentation is needed.



CANADA LYNX CRITICAL HABITAT SCREENING PROCESS, PART 2

Table D1: Screening criteria for projects included in Canada Lynx Critical Habitat

#	Activity Type	Activity Component	Screening Criteria	Determination
1	Ditches and Diversions	NA	NA	NLAA
2	Habitat Restoration	Wildlife, Fisheries and Rare Plant Habitat Management - This includes aspen rejuvenation, shrub field maintenance and other types of ecosystem-driven projects designed to promote or restore natural processes in an area	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • If in matrix habitat (PCE 1d), activities would not create a barrier or impede lynx movement between patches of foraging habitat and between foraging and denning habitat within a potential home range AND activities would not adversely affect adjacent foraging habitat or denning habitat. • If not in matrix habitat, project activities do not result in a permanent loss of potential boreal forest or potential to provide PCE 1a or 1c. 	NLAA
3	Hardrock Mining and Gravel Pits	Quarries, recreational mining, small mines, exploratory drilling, and reclamation of small mines	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met • Activity is consistent with existing access management specific to lynx from Forest Plans and Travel Plans. • Activity occurs within existing disturbed area footprint. 	NLAA
4	Range Management (Activities that Affect Vegetative Conditions)	Livestock grazing in post-fire and post-harvest areas, aspen stands, shrub-steppe habitats or riparian areas or installation of range improvements	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • Unless in matrix habitat, livestock grazing is managed to be compatible with improving or maintaining lynx habitat. 	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
5	Recreation Management (Activities that Potentially Affect Vegetative Conditions)	<i>Developing new or expanded recreation developments</i> - (includes developing or expanding ski areas beyond the existing permit area; planned recreational developments and operations, campgrounds) that result in permanent habitat loss	NA	Potential LAA, Follow Standard Consultation
		<i>Recreation Special Uses</i> - This includes activities for which permits are issued and includes outfitting and permits issued to a variety of organizations that engage in activities such as mountaineering, rock climbing, outward bound, ski races, foot races, concerts, "Poker Runs," "Fun Runs," driving tours, nature watch hikes, hunting, fishing, etc.	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met • Activity is consistent with existing access. management specific to lynx from Forest Plans and Travel Plans. 	NLAA
		<i>Trail Use consistent with existing travel management</i>	NA	NLAA
		<i>Maintenance and/or Minor Trail Re-routes</i> - This consists of maintenance of trails and minor trail re-routes and may require use of heavy equipment	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met • Activity is consistent with existing access. management specific to lynx from Forest Plans and Travel Plans. 	NLAA
		<i>New Trail Construction and/or Major Trail Re-routes and Maintenance</i> - This includes the development of new trails used for foot, stock, or motorcycles and may require the use of heavy equipment or hand tools and may create a clearing width up to 10 feet wide (FSH 2309.18); this also includes major re-routing and may require use of heavy equipment and/or blasting	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met • Activity is consistent with existing access. management specific to lynx from Forest Plans and Travel Plans. 	NLAA
		<i>Camping</i> – Includes dispersed and existing developed campgrounds	NA	NE

#	Activity Type	Activity Component	Screening Criteria	Determination
		<i>Permitted and Non-permitted use of existing Developed Sites, Facilities, and Their Maintenance</i> - This includes special use permits issued for facilities, residences, other structures; permits issued for organizational camps such as the Boy Scouts and church groups at developed campgrounds; other facilities but not limited to campgrounds, rental cabins, watchable wildlife sites, picnic areas, warming huts, and communication sites. Also includes FS administrative sites	NA	NLAA
6	Roads and Road Maintenance	<i>New Permanent Construction</i> - Highway or forest highway construction and project-level specified roads	NA	Potential LAA, Follow Standard Consultation
		<i>New Temporary Construction</i> - Project-level specified roads	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • If in boreal forest vegetation types, the temporary road is rehabilitated so that a high density of conifers, hardwoods, and shrubs will grow. • If in matrix habitat (PCE 1d) activities <i>would not</i> create a barrier or impede lynx movement between patches of foraging habitat and between foraging and denning habitat within a potential home range AND activities would not adversely affect adjacent foraging habitat or denning habitat. 	NLAA
		<i>Road Maintenance</i> - This includes general road maintenance that may involve the brushing of vegetation on the road or along roadsides; road maintenance may include but is not limited to roadbed blading, brushing, cleaning ditches, replacing or cleaning culverts, replacing bridges, cleaning dips, or spot graveling	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • In lynx habitat not providing PCE 1a, no screening criteria are required. • If in matrix habitat (PCE 1d) activities <i>would not</i> create a barrier or impede lynx movement between patches of foraging habitat and between foraging and denning habitat within a potential home range AND activities would not adversely affect adjacent foraging habitat or denning habitat. 	NLAA
		<i>Hazard Tree Removal</i>	NA	NLAA
		<i>Forest or Back-country Road Decommissioning</i> -- Roads that are generally not paved with vehicle speeds	NA	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
		typically less than 35 miles per hour; the surface can be gravel or natural materials; this involves the use of heavy equipment to prepare the road surface and includes obliteration and other methods to hydrologically neutralize the road		
		<i>Existing Road and Parking Area Upgrades</i> (within existing disturbed area footprint)	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • Project <i>does not</i> result in increased traffic speed or volume. • Project does not result in a foreseeable contribution to increases in human development. 	NLAA
		<i>General Road Use</i> - This includes hauling timber, removing mining waste and materials, and moving livestock over federal roads for which permits are required; it also includes routine road use by administrative units to carry out work associated with recreation, range, timber and minerals management, fire prevention and suppression, inventories, surveys, and other monitoring activities.	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met • Activity is consistent with existing access. management specific to lynx from Forest Plans and Travel Plans. 	NE
7	Salvage Harvest	<i>Burned Habitat</i> - Includes salvage harvest of burned areas that converted habitat to early stand initiation structural stage that does not yet provide snowshoe hare habitat	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • If in matrix habitat (PCE 1d) activities <i>would not</i> create a barrier or impede lynx movement between patches of foraging habitat and between foraging and denning habitat within a potential home range AND activities would not adversely affect adjacent foraging habitat or denning habitat. 	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
		<i>Non-burned Habitat</i> - Includes dead, damaged, and dying trees due to causes other than fire	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • If in boreal forest vegetation types, management conforms to the <u>conservation measures for vegetation management in core areas</u> (see page 14); project recruits a high density of conifers, hardwoods, shrubs where it is currently lacking . • If in matrix habitat (PCE 1d) activities <i>would not</i> create a barrier or impede lynx movement between patches of foraging habitat and between foraging and denning habitat within a potential home range AND activities would not adversely affect adjacent foraging habitat or denning habitat. 	NLAA
8	Silviculture Activities	<i>Tree planting</i>	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met • Activity <i>does not</i> result in stand type conversion that impacts potential lynx habitat. 	NLAA
		<i>Disease control</i> – manual treatment of larch through girdling to control larch mistletoe; protection of rust-resistant whitebark pine or white pine trees; placement of pheromone packets	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • If in matrix habitat (PCE 1d), activities <i>would not</i> create a barrier or impede lynx movements AND activities would not adversely affect adjacent foraging habitat or denning habitat. 	NLAA
9	Special Uses (Other)	This includes non-recreation special uses, mineral and energy exploration and development and maintenance of existing sites, corridors, or other facilities and is often carried out by the entity that owns the structures or facilities; maintenance may include vegetation blading or cutting, or spraying to reduce brush and reduce the invasion of shrubs and trees among other activities	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • Activity is consistent with existing access management direction specific to lynx from Forest Plans and Travel Plans and occurs within existing disturbed area footprint. 	NLAA
10	Surveys	This includes snow course surveys, patrols, track counts, habitat sampling, hair posts, remote camera stations, and radio telemetry among other methods	NA	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
11	Vegetation Management (in PCE 1d - Matrix Habitat - including fuel treatments within the WUI)	Vegetation management (except for emergency actions during a wildfire ¹) in matrix habitat that changes the composition and structure of habitat using such means as prescribed fire, precommercial thinning, commercial thinning, or other types of timber harvest (except for salvage harvest); includes felling, skidding, and/or hauling of timber products (not including salvage harvest); includes vegetation management action that reduces the threat of ignition, fire intensity, or rate of spread, or is used to restore fire-adapted ecosystems. <i>(NOTE: Does not include "Forest Products" such as personal-use post and pole sales, firewood collection, Christmas tree/bough cutting, and bear grass collection as these are all "No Effect" if they do not impact PCE 1a snowshoe hare habitat.)</i>	<ul style="list-style-type: none"> Applicable NRLMD standards & guidelines are met. Project activities do not create permanent travel routes or permanent firebreaks on ridges or saddles that could impede lynx movements. Project activities do not create a barrier to lynx movement (PCE 1d), or adversely affect PCE elements 1a, 1b, or 1c in adjacent boreal forest. 	NLAA
			<ul style="list-style-type: none"> Project creates a permanent travel route or firebreak or may otherwise impede lynx movements through the landscape (PCE 1d), OR Activities alter the physical and biological features to an extent that they may significantly affect the conservation value of adjacent boreal forest for PCE elements 1a, 1b, or 1c. 	Potential LAA, Follow Standard Consultation
12	Vegetation Management (In mapped Lynx Habitat that is not in Matrix Habitat)	Vegetation management or removal of tree products in lynx critical habitat that does not currently provide snowshoe hare habitat using such means as precommercial thinning, prescribed fire, or timber harvest. This includes post/pole sales, other forest products, Christmas tree/bough cutting, commercial firewood removal, etc.; and includes felling, skidding, and/or hauling of timber products.	<ul style="list-style-type: none"> Applicable NRLMD standards & guidelines met. Project activities <i>do not</i> result in a permanent loss of any potential boreal forest or potential to provide PCE 1a or 1. Conform to the <u>conservation measures for vegetation management in core areas (see page 14)</u>; project recruits a high density of conifers, hardwoods, and shrubs where currently lacking. 	NLAA
			<ul style="list-style-type: none"> Activities <i>could</i> result in permanent loss or conversion of the boreal forest, such as permanent travel routes or permanent firebreaks on ridges or saddles, OR Activities do not conform to the <u>conservation measures for vegetation management in core areas (see page 14)</u>. 	Potential LAA, Follow Standard Consultation
13	Weed Management	This includes chemical and biological treatments to noxious weeds	NA	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
14	Miscellaneous	Activity component not listed specifically above	<ul style="list-style-type: none"> • Applicable NRLMD standards & guidelines are met. • If in mapped lynx habitat, project activities <i>do not</i> result in a permanent loss of any existing or potential boreal forest or potential to provide PCE 1a or 1c. • If in matrix habitat, project activities do not create a barrier to lynx movement (PCE 1d) AND activities do not adversely affect PCE elements 1a or 1c in adjacent boreal forest. 	NLAA

APPENDIX E: Consultation Summary Sheet for Programmatic Assessment

Project Name: _____

Programmatic Biological Assessment for Activities Not Likely to Adversely Affect Threatened and Endangered Terrestrial Wildlife Species

Forest: _____ Wildlife Biologist: _____ Date: _____ District: _____ Reviewed by Forest Biologist: _____ Date: _____					
Project Location, Timing, and Description	Species	Effects of Action	Cumulative Effects (Reasonably foreseeable state and private actions)	How does the project meet screening criteria? (Use footnotes to refer to screening criteria used below)	Determination of Effects
[Describe here or refer to lengthy description with maps below]	Grizzly Bear	X	X	Example: Area does not have existing wheeled motorized access conditions resulting in potentially significant (per ESA use) effects, food storage rule is in effect, and there would be no seeding or planting of palatable forage ¹ . Camping would occur only at developed campgrounds and there would be no caching of food or equipment ² . Event would not lead to potential disturbance of bears from high-quality forage resources or Core/Secure habitat, permit includes "bear country safety" education message, and event is non-linear ³ .	X
	Canada Lynx	X		X	X
	Canada Lynx Critical Habitat	X		X	X

The following design criteria and other factors are relevant for the evaluation of effects on threatened and endangered wildlife species:

[List all relevant design features]

Screening Criteria Used:

Example:

¹ *Grizzly Bear Screening Process, Part 1 Flow Chart*

² *Grizzly Bear Screening Process, Part 2 Table, #1 Camping*

³ *Grizzly Bear Screening Process, Part 2 Table, #14 Special Uses (Recreation)*

³ *Canada Lynx Screening Process, Part 1 Flow Chart*

⁴ *Canada Lynx Screening Process, Table B1, #3 Recreation Management, Recreation Special Uses activity component*

⁵ *Canada Lynx Critical Habitat Screening Process, Part 1 Flow Chart*

⁶ *Canada Lynx Critical Habitat Screening Process, Part 2 Table D1, #6 Recreation Management (Activities that Potentially Affect Vegetative Conditions), Recreation Special Uses activity component*

This consultation summary sheet must be filled out by Project Biologists for all projects and actions reviewed and analyzed using the wildlife screen process. These should be submitted to their Forest Biologists for review and submission to the U.S. Fish and Wildlife Service for review on a semi-annual basis. The Regional Consultation Team will select a number of projects at random and review the use of the screens and documentation.